

**REPORT NUMBER: SPNCAP-CAL-17-010**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
SIDE IMPACT POLE TEST**

**Fuji Heavy Industries LTD.  
2017 Subaru Impreza  
Four Door Sedan**

**NHTSA No: O20175501**

**PREPARED BY:  
CALSPAN CORPORATION  
P.O. BOX 400  
BUFFALO, NEW YORK 14225**



**March 24, 2017**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
MAIL CODE: NRM-110  
1200 NEW JERSEY AVE SE, ROOM W43-410  
WASHINGTON, D.C. 20590**

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Vanessa Hansen, Senior Test Engineer

Date: March 24, 2017

Approved by: Edward Dutton  
Edward Dutton, Operations Manager  
Transportation Test Operations

Date: March 24, 2017

#### **FINAL REPORT ACCEPTANCE BY OCWS:**

\_\_\_\_\_  
Division Chief, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

\_\_\_\_\_  
COTR, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

# **TECHNICAL REPORT DOCUMENTATION PAGE**

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<b>15. Supplementary Notes</b>																														
<p><b>16. Abstract</b>  A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2017 Subaru Impreza four door sedan in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 23, 2017.</p> <p>The impact velocity of the vehicle was 32.23 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 333 mm located at level 3. The test vehicle's occupant performance data is as follows:</p> <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No. 300)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>36</sub>)</td> <td></td> <td>1000</td> <td>200.682</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>48.696</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3665.150</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>16.888</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>21.849</td> </tr> </tbody> </table> <p>The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.</p>				Measurement Description	Driver ATD (SID-IIs) (Serial No. 300)			Units	Threshold	Result	Head Injury Criteria (HIC <sub>36</sub> )		1000	200.682	Resultant Lower Spine Acceleration	G	82	48.696	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3665.150	Maximum Thoracic Rib Deflection	mm	38	16.888	Maximum Abdomen Rib Deflection	mm	45	21.849
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<b>17. Key Words</b> New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																												
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## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

This side impact test was conducted as part of the MY 2017 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2017 Subaru Impreza four door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

## SECTION 2

### SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2017 Subaru Impreza four door sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.23 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 23, 2017. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included on page 3-11 in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG tri-axial accelerometers

Thorax upper, middle, and lower rib displacement potentiometers

Abdomen upper and lower rib displacement potentiometers

Lower spine tri-axial accelerometers

Iliac load cell

Acetabulum load cell

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D identifies all serial numbers, manufacturers, and calibration dates for test equipment, dummy sensors, potentiometers, and load cells used to collect data during the test.

Injury readings for the SID-IIs dummy were recorded as follows:

### INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC <sub>36</sub> )		1000	200.682
Resultant Lower Spine Acceleration	g	82	48.696
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3665.150
Maximum Thoracic Rib Deflection	mm	38*	16.888
Maximum Abdominal Rib Deflection	mm	45*	21.849

\*Proposed IARV

Supplemental restraint information was recorded as follows:

**SUPPLEMENTAL RESTRAINT INFORMATION**

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

**GENERAL COMMENTS:**

1. P1 serial number – 300

**Data Anomalies:**

- Front Seat Track Y Acceleration, Questionable spike 76.7ms

### **SECTION 3**

#### **OCCUPANT AND VEHICLE INFORMATION**

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 – General Test and Vehicle Parameter Data

Data Sheet No. 2 – Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and instrumentation Data

Data Sheet No. 6 – Vehicle Accelerometer Data

Data Sheet No. 7 – Rigid Pole Load Cell Data

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – Test Vehicle Profile Measurements

Data Sheet No. 10 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 – Vehicle Damage Profile Distances

Data Sheet No. 12 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 13 – Dummy / Vehicle Temperature and Humidity Stabilization Data

**DATA SHEET NO. 1**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	O20175501
Model Year	2017
Make	Subaru
Model	Impreza
Body Style	Four Door Sedan
VIN	4S3GKAB64H3601583
Body Color	Red
Odometer Reading (km/mi)	38.6 km / 24 mi
Engine Displacement (L)	2.0
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	No
Power Window Auto-Reverse	No
Other Optional Feature	--
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso / Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	-

Does owner's manual provide instructions to turn off automatic door locks?

N/A

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Fuji Heavy Industries
Date of Manufacture	11/16
Vehicle Type	Passenger

GVWR (kg)	1950
GAWR Front (kg)	990
GAWR Rear (kg)	1000

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Capacity Weight (VCW) (kg)				385
DSC X 68.04 kg				340.2
Cargo Weight (RCLW) (kg)				44.8

(A)

(B)

(A-B)

**VEHICLE SEAT TYPE**

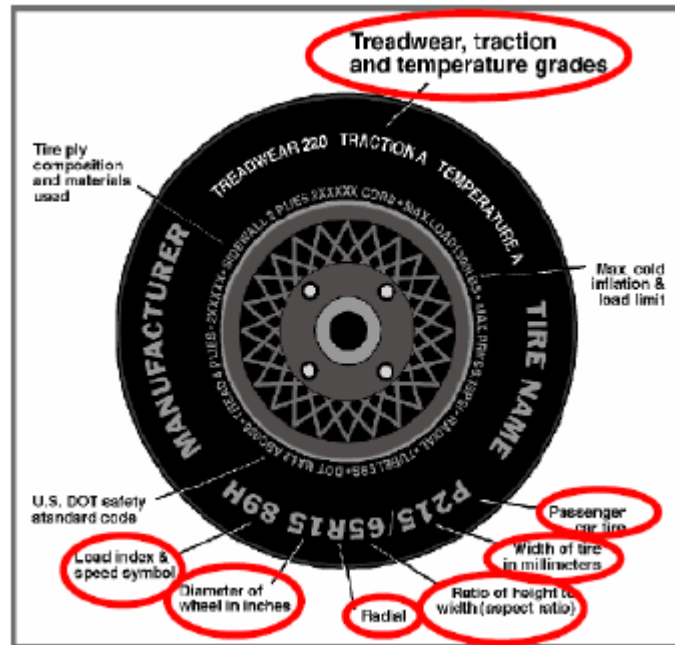
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat		X			X		
Third Row seat							

**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017

*Collected for year, make, model, & VIN, all items circled in red, tire manufacturer and tire name.*



**VEHICLE TIRE INFORMATION**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	220
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Continental	Continental
Tire Model	ProContact	ProContact
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	89V	89V
Tire Material	Rubber	Rubber
DOT Safety Code Left	A3T2WC394516	A3T2WC394416
DOT Safety Code Right	A3T2WC394516	A3T2WC394516

**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017

**TIRE PRESSURES**

	Units	LF	RF	LR	RR
As Delivered	kPa	245	242	240	244
Tire Placard	kPa	230	230	220	220
Owner's Manual	kPa	230	230	220	220
As Tested	kPa	230	230	220	220

**TEST VEHICLE AXLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	430	281		445	308		448	325	
Right	kg	401	291		415	317		404	325	
Ratio	%	59	41		58	42		57	43	
Totals	kg	831	572	1403	860	625	1485	852	650	1502

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1403	(A)
Actual Weight of 1 P572V (SID-ILs) ATD Used	kg	44.12	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1491.92	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range  
 (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? ☒ Yes ☐ No

**TEST VEHICLE ATTITUDES AND CG**

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	0.0	-0.1	-0.1	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	+0.2	-0.2	-0.3	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	+0.1	-0.3	-0.3	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	0.0	0.0	-0.2	Yes
Vehicle CG (Aft of Front Axle)	mm	1090	1126	1158	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	10.5	10.5	22.5	

\* ND = Nose Down (-), NU = Nose Up (+)

\*\* LD = Left Down (-), LU = Left Up (+)

\*\*\* The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement

**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

Component Description	Weight (kg)
Trunk Carpeting	4
Spare Tire	11
Jack	2
Tail Light	1
Rear Bumper Cover & Bumper Beam	10
Passenger Windows and door parts	11
Ballast / Equipment Added	0

Test Height – Adjustable Suspension Setting, if Applicable	N/A
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**DATA SHEET NO. 2**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017

**SEAT POSITIONING**

*The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.*

**SCRL ANGLE RANGE**

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	16.8	12.6	14.7
Front Passenger Seat	Not Adjustable		
Front Center Seat	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

**SEAT HEIGHT AND ANGLE**

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward- Most
Driver Seat	14.7	27	Max	-	-	-
			Mid	19	27	36
			Min	-	-	-
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Front Center Seat	N/A	N/A	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

**DATA SHEET NO. 2 ... (CONTINUED)**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

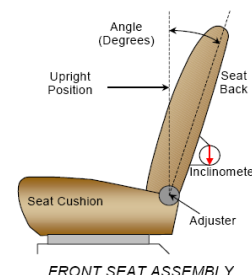
NHTSA No.: O20175501  
 Test Date: 2/23/2017

**SEAT FORE / AFT POSITION**

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	260	27 (0-26)	0	0
Front Passenger Seat	260	27 (0-26)	0	0
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat	FIXED	FIXED	FIXED	FIXED

**SEAT BACK ANGLE ADJUSTMENT**

*The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5<sup>th</sup> percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back are set to match the struck-side rear seat back.*



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	-8.7 to 67.3	N/A	2.3	N/A
Front Passenger Seat	-8.8 to 66	N/A	2.1	N/A
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat	FIXED	FIXED	FIXED	FIXED

**SEAT BELT ANCHORAGE ADJUSTMENT**

*Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. Zero is defined as the uppermost detent*

Seat	Total # of Positions	Placed in Position #
Driver Seat	4 (0-3)	0 – Uppermost

**HEAD RESTRAINT ADJUSTMENT**

*The driver's head restraint is adjusted to the lowest and most full forward in-use position.*

Seat	Total # of Positions	Placed in Position #
Driver Seat	3 (0-2)	2 – Lowest

**DATA SHEET NO. 2 ... (CONTINUED)**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**

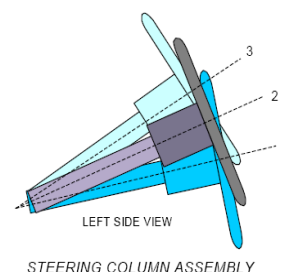
Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017

**STEERING COLUMN ADJUSTMENT**

*Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.*

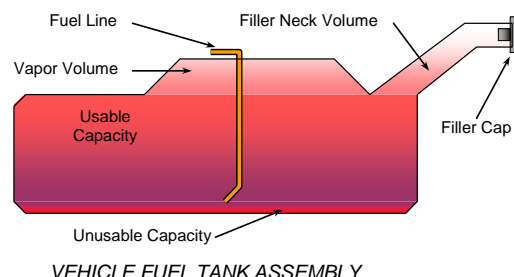
		Degrees	Fore / Aft Position (mm)
Lowermost	– Position 1	22.1	
Geometric Center	– Position 2	23.9	
Uppermost	– Position 3	25.7	
Telescoping Steering Wheel Travel			50
Test Position		23.9	25



**FUEL PUMP**

*Describe the fuel pump type, details about how it operates, and the location of the fuel filler neck.*

The vehicle is equipped with an electric fuel pump.  
The fuel filler neck is on the right side of the vehicle.  
The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



**FUEL TANK CAPACITY DATA**

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	50
Usable Capacity of "Optional Tank" - see Form No. 1	N/A
Usable Capacity of "Standard Tank" - see Owner's Manual	50
Usable Capacity of "Optional Tank" - see Owner's Manual	N/A
93% of Usable Capacity	46.5
Actual Amount of Solvent Used in Test	46.5
1/3 of Usable Capacity	16.7

Is the Actual Amount of Solvent Used in the test equal to 93%  $\pm$  1% of the Usable Capacity stated in Form No. 1?



Yes

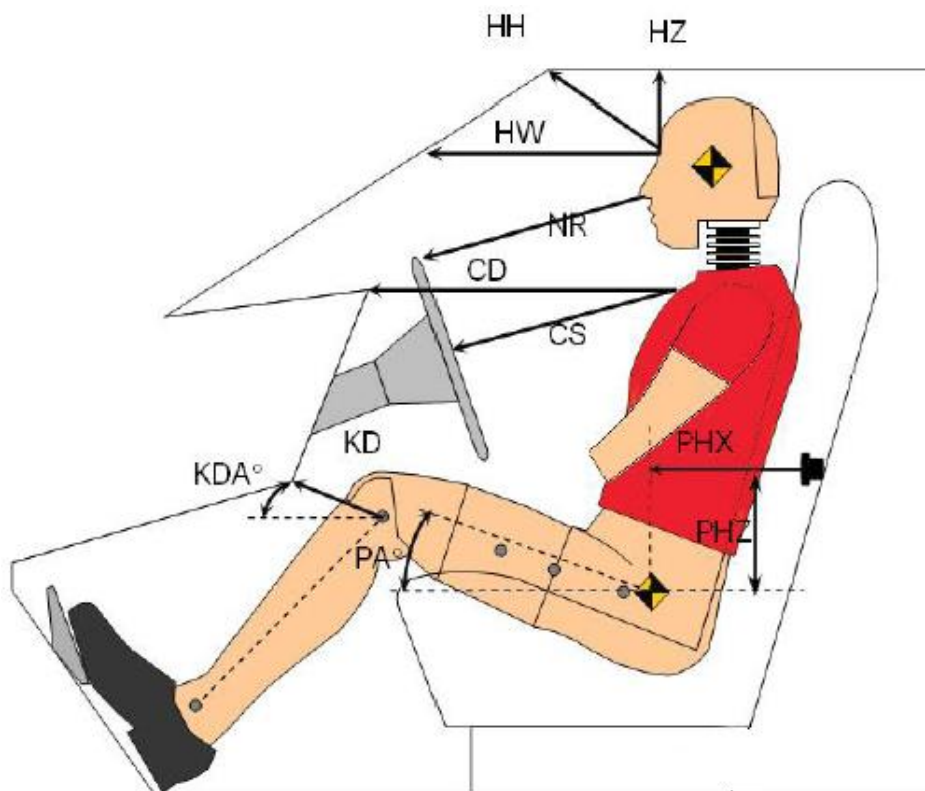


No

**DATA SHEET NO. 3**  
**DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017



**Left Side View**

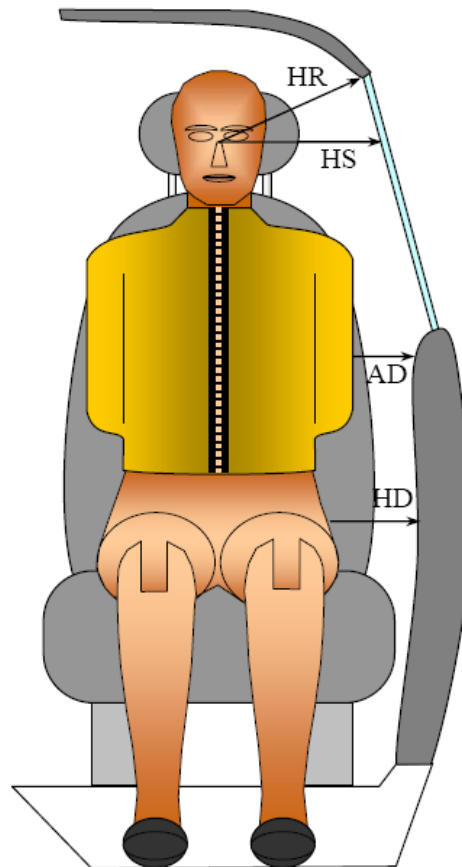
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	264	
HW	Head to Windshield	580	
HZ	Head to Roof Liner	184	
NR	Nose to Rim	228	
CD	Chest to Dash	426	
CS	Chest to Steering Wheel	163	
KD(L) / KDA(L)°	Left Knee to Dash	104	21.7
KD(R) / KDA(R)°	Right Knee to Dash	104	22.4
PAX°	Pelvic Tilt Angle (X-Axis)		19.2
PAY°	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	377	
PHZ	Hip Point to Striker (Z-Axis)	196	

**DATA SHEET NO. 4**  
**DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017



*FRONT VIEW OF DUMMY*

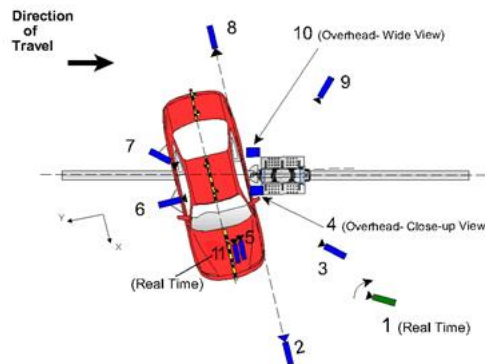
**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

Code	Measurement Description	Units	Driver - Length (Serial No. 300)
HR	Head To Side Header	mm	249
HS	Head to Side Window	mm	370
AD	Arm to Door	mm	181
HD	Hip Point to Door	mm	181

## DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017



### CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	8720	0	-1332	24	1000
3	Impact side 45° - forward pole view	4910	-2014	-1878	24	1000
4	Overhead Close-up view of impact	0	0	-5203	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-8646	0	-1467	24	1000
9	Impact side 45° - rearward pole view	-2812	-4100	-1891	24	1000
10	Overhead wide - view of impact	-80	305	-5203	14	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

Notes: Reference - From Point of Impact for X and Y; from Ground for Z  
 +X = Forward of vehicle, +Y = Right of vehicle, +Z = Down  
 \* All measurements accurate to  $\pm 6$  mm. Vehicle is at a 75° angle to the rigid pole.

Comments: All cameras operated as intended.

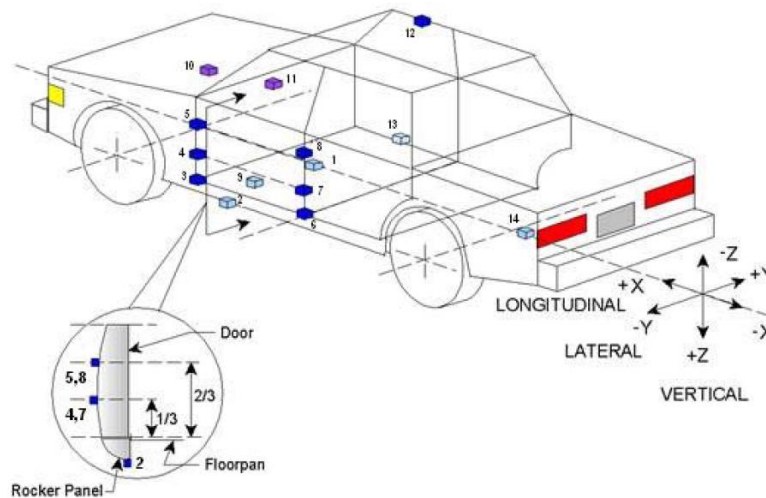
### INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

## DATA SHEET NO. 6 VEHICLE ACCELEROMETER DATA

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017



### TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2459	0	-40
2	Left Floor Sill	2459	0	-40
3	A-Pillar Sill	2719	-671	164
4	A-Pillar Low	3143	-637	71
5	A-Pillar Mid	3173	-645	-72
6	B-Pillar Sill	3167	-646	-537
7	B-Pillar Low	2135	-668	67
8	B-Pillar Mid	2068	-672	-162
9	Driver Seat Track	2030	-663	-428
10	Engine Top	2292	-545	127
11	Firewall	4002	6	-166
12	Right Roof	3488	64	-226
13	Right Floor Sill	2163	509	-1006
14	Rear Floorpan	2730	674	154

Reference: X – Rear surface of vehicle (+ forward)  
Y – Vehicle centerline (+ to right)  
Z – Ground plane (+ down)

**DATA SHEET NO. 7**  
**RIGID POLE LOAD CELL DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017

**POLE BARRIER**



**RIGID POLE LOAD CELL LOCATIONS**

ID	Units	Height From Ground
1	mm	200
2	mm	590
3	mm	750
4	mm	1075
5	mm	1260
6	mm	1740
7	mm	1920
8	mm	2300



**DATA SHEET NO. 8  
POST-TEST OBSERVATIONS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017

**TEST DUMMY INFORMATION AND CONTACT POINTS**

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Curtain Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Headrest
Left Shoulder	Seatback & Torso/Pelvis Airbag
Upper Torso	Seatback & Torso/Pelvis Airbag
Lower Torso	Seatback & Torso/Pelvis Airbag
Left Hip	Seatpan & Torso/Pelvis Airbag
Left Knee	Driver Door

**POST-TEST DOOR PERFORMANCE**

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	0	0	0	0	0

**POST-TEST SEAT PERFORMANCE**

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

**DATA SHEET NO. 8 ... (CONTINUED)**  
**POST-TEST OBSERVATIONS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017

**POST-TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracks throughout with separation along driver's A-Pillar
Side Window Damage	Driver's window shattered
Other Notable Effects	None

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

**VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA**

Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1096
Actual Impact Point - Aft of Front Axle	mm		1098
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 *	-2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75.0
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.23
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	0.00**

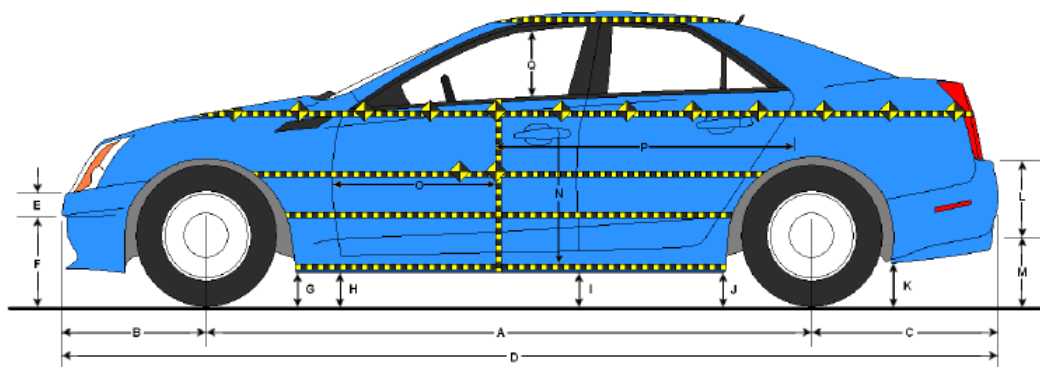
\* Of Intended Impact Point

\*\*Speed Trap Malfunction

# **DATA SHEET NO. 9** **TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017



LEFT SIDE VIEW

## **VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

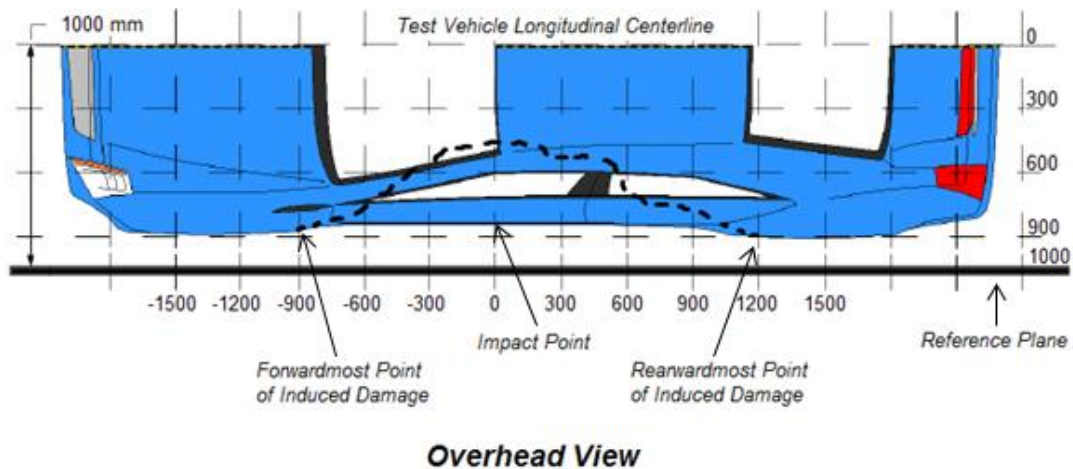
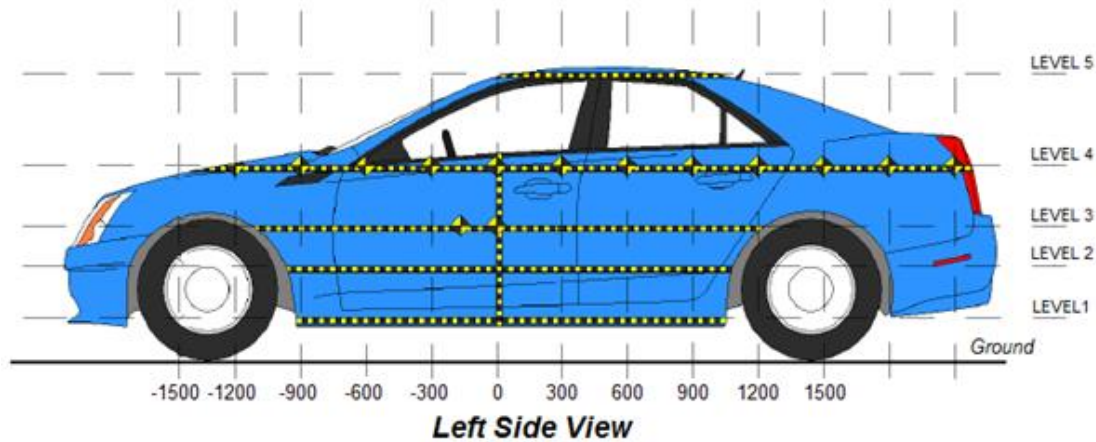
Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2675	2596	78
B	Front Axle to FSOV	956	998	-43
C	Rear Axle to RSOV	994	988	6
D	Total Length at Centerline	4624	4583	41
E	Front Bumper Thickness	110	110	0
F	Front Bumper Bottom to Ground	374	390	-16
G	Sill Height at Front Wheel Well	197	183	14
H	Sill Height at Front Door Leading Edge	183	173	10
I	Sill Height at B-Pillar	182	203	-21
J1	Sill Height at Rear Wheel Well	191	195	-4
J2	Pinch Weld Height at Rear Wheel Well	162	182	-20
K	Sill Height Aft of Rear Wheel Well	378	348	30
L	Rear Bumper Thickness	335	335	0
M	Rear Bumper Bottom to Ground	320	287	33
N	Sill Height to Bottom of Front Window Sill	-767	-771	4
O	Front Door Leading Edge to Impact CL	623	538	85
P	Rear Door Trailing Edge to Impact CL	1514	1433	81
Q	Front Window Opening	-386	-383	-3
R	Right Side Length	4577	4570	7
S	Left Side Length	4575	4516	60
T	Vehicle Width at B-Pillars	1774	1677	97

\* All measurements in mm with tolerance of  $\pm 3\text{mm}$

# **DATA SHEET NO. 10** **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017



## **MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	218	277	0
2	Occupant Hip Point	mm	495	328	0
3	Mid - Door	mm	580	333	0
4	Window Sill	mm	862	315	0
5	Window Top	mm	1381	116	0

**NOTE:** The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

**DATA SHEET NO. 10 ... (CONTINUED)**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017

**EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL**

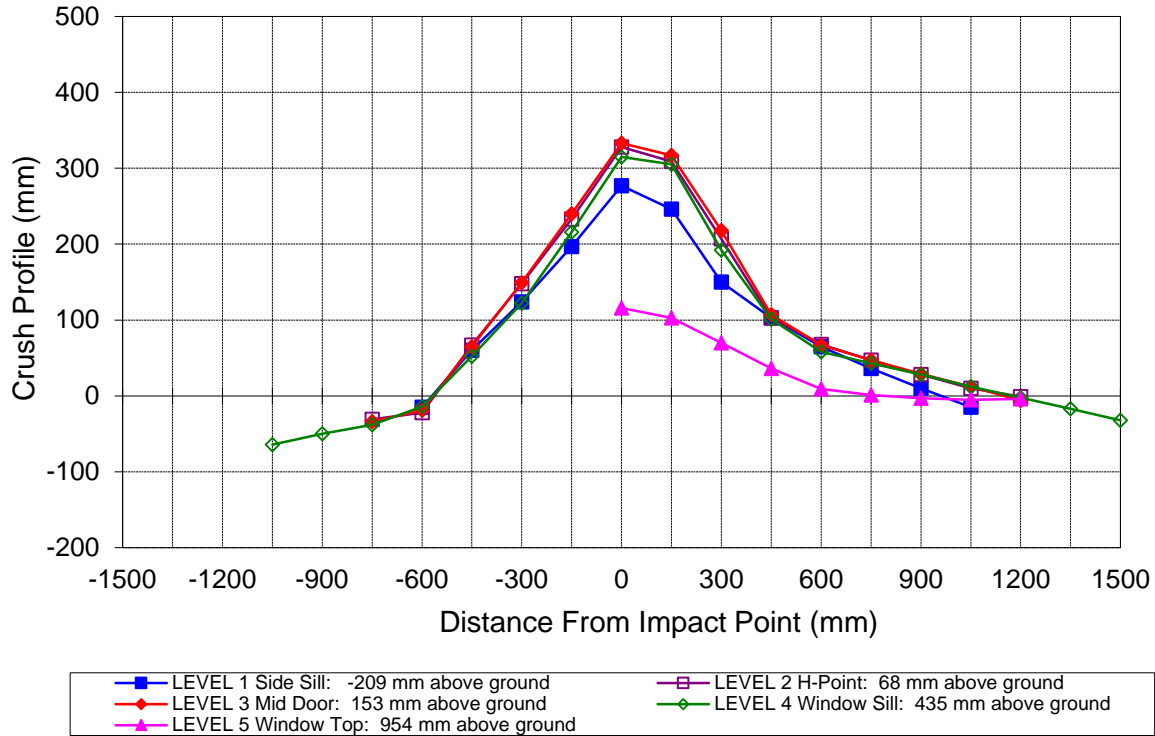
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050				811					875					-64	
-900				818					868					-50	
-750		889	890	817			920	924	855			-31	-34	-38	
-600	842	885	885	826		857	907	904	840		-15	-22	-19	-14	
-450	836	883	884	840		776	816	819	788		60	67	65	52	
-300	831	883	886	852		707	735	737	730		124	148	149	122	
-150	829	884	887	860		632	651	647	644		197	233	240	216	
0	829	884	887	865	584	552	556	554	550	468	277	328	333	315	116
150	829	884	887	864	612	583	575	570	559	509	246	309	317	305	103
300	829	883	887	860	614	679	676	669	668	544	150	207	218	192	70
450	829	883	887	863	613	726	780	780	762	577	103	103	107	101	36
600	827	878	883	863	613	762	810	816	805	604	65	68	67	58	9
750	825	876	880	861	612	789	829	833	818	611	36	47	47	43	1
900	824	875	879	859	608	814	847	850	831	611	10	28	29	28	-3
1050	827	877	881	858	596	842	867	869	846	601	-15	10	12	12	-5
1200		884	885	863	498		885	891	865	502		-1	-6	-2	-4
1350				883					900					-17	
1500				868					900					-32	

**NOTE:** Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

**DATA SHEET NO. 10 ... (CONTINUED)**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017



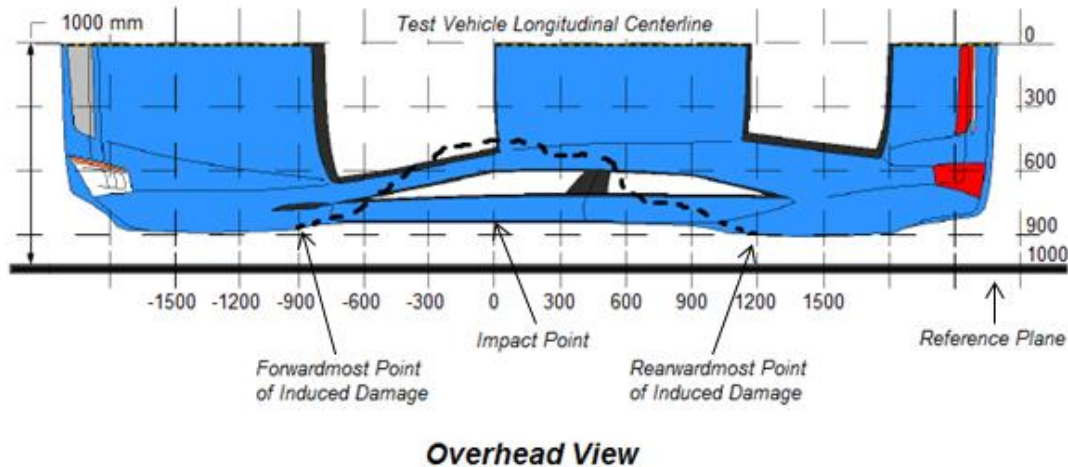
**Vehicle Exterior Crush Measurements - Visual Representation**

## DATA SHEET NO. 11 VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2017 Subaru Impreza four door sedan  
Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
Test Date: 2/23/2017

For guidance regarding damage profile distance measurements, please refer to the latest version of the *NHTSA Test Reference Guide, Volume 1: Vehicle Tests*.



## VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-750	3	76	110	-34
2	-360	3	230	115	115
3	30	3	443	113	330
4	420	3	242	113	129
5	810	3	160	120	40
6	1200	3	109	115	-6

**DATA SHEET NO. 12**  
**FMVSS NO. 301 STATIC ROLLOVER RESULTS**

Test Vehicle: <u>2017 Subaru Impreza four door sedan</u>	NHTSA No.: <u>O20175501</u>
Test Program: <u>NCAP Side MDB Impact Test</u>	Test Date: <u>2/23/2017</u>
Test Time: <u>9:40 AM</u>	Temperature: <u>21° C</u>

- A. From impact until vehicle motion ceases: 0 oz.  
 (Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: 0 oz.  
 (Maximum allowable is 5 oz.)
- C. For the following 25 minutes: 0 oz.  
 (Maximum allowable is 1 oz./minute)
- D. Spillage Details: No Spillage Occurred

**FMVSS NO. 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	73	300	373
90° to 180°	65	300	365
180° to 270°	60	300	360
270° to 360°	69	300	369

**FMVSS NO. 301 ROLLOVER SPILLAGE TABLE**

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

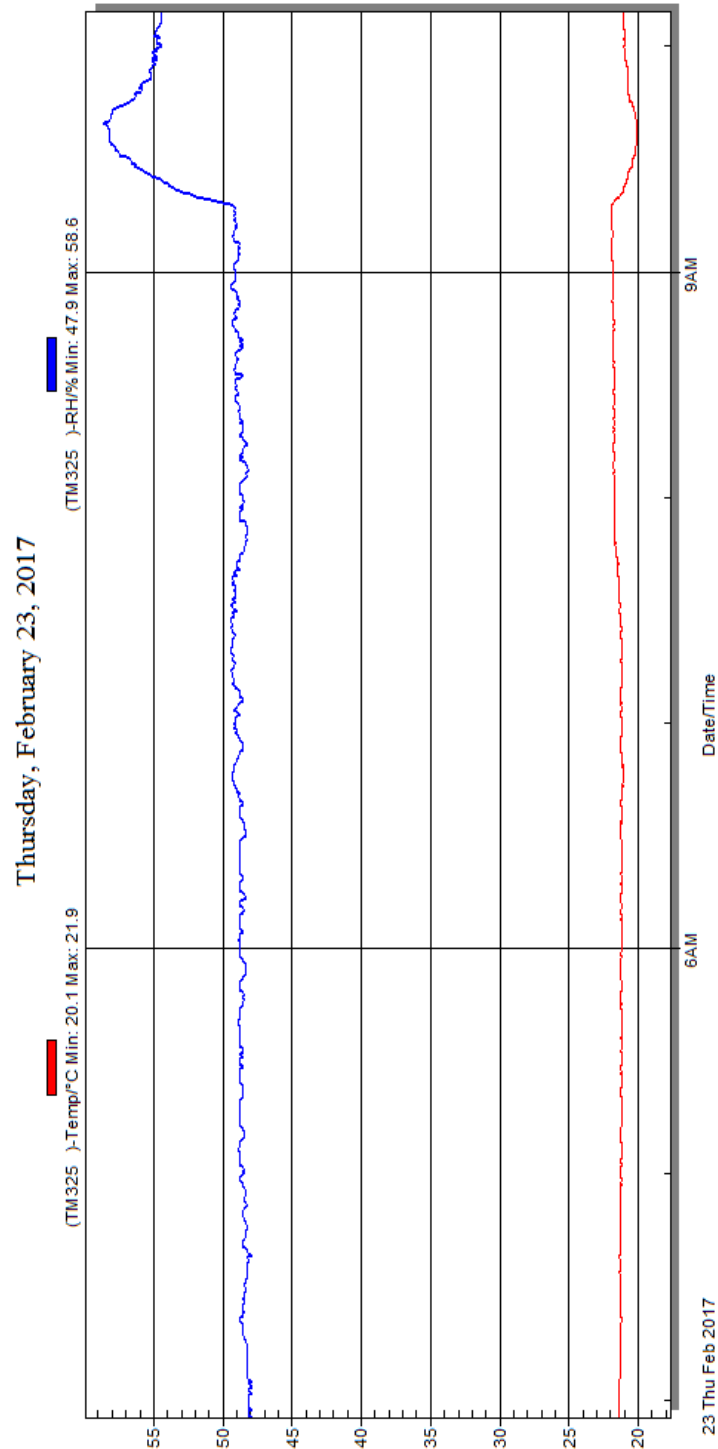
Test Phase	Spillage Location
0° to 90°	No Spillage Occurred
90° to 180°	No Spillage Occurred
180° to 270°	No Spillage Occurred
270° to 360°	No Spillage Occurred



**DATA SHEET NO. 13**  
**DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA**

Test Vehicle: 2017 Subaru Impreza four door sedan  
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: O20175501  
 Test Date: 2/23/2017



**Temperature and Humidity Stabilization Chart / Data for Dummies and Test Vehicle**

**APPENDIX A**  
**PHOTOGRAPHS**

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<b>Fig.</b>	<b>Description</b>	<b>Page</b>
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**Figure A-1: As Delivered Right Front  $\frac{3}{4}$  View of Test Vehicle**

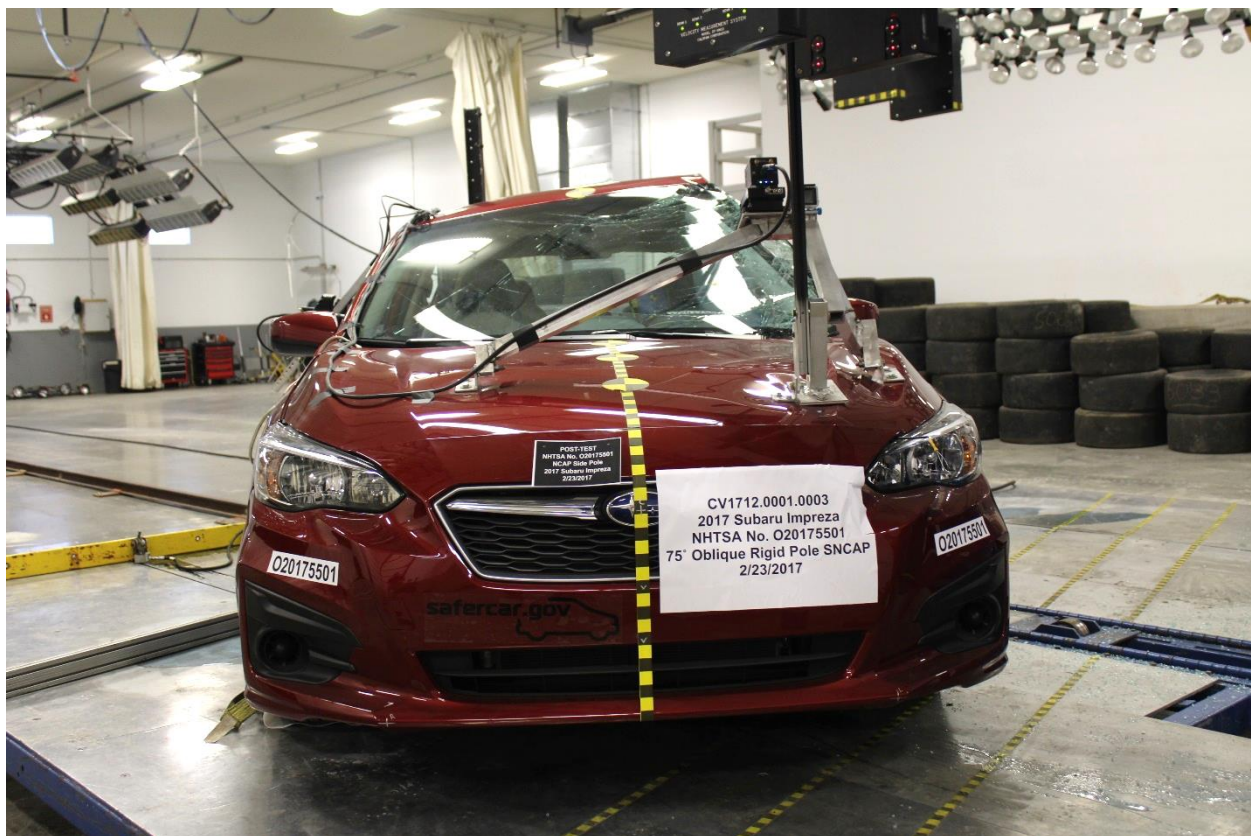


**Figure A-2: As Delivered Left Rear  $\frac{3}{4}$  View of Test Vehicle**





**Figure A-3: Pre-Test Frontal View of Test Vehicle**

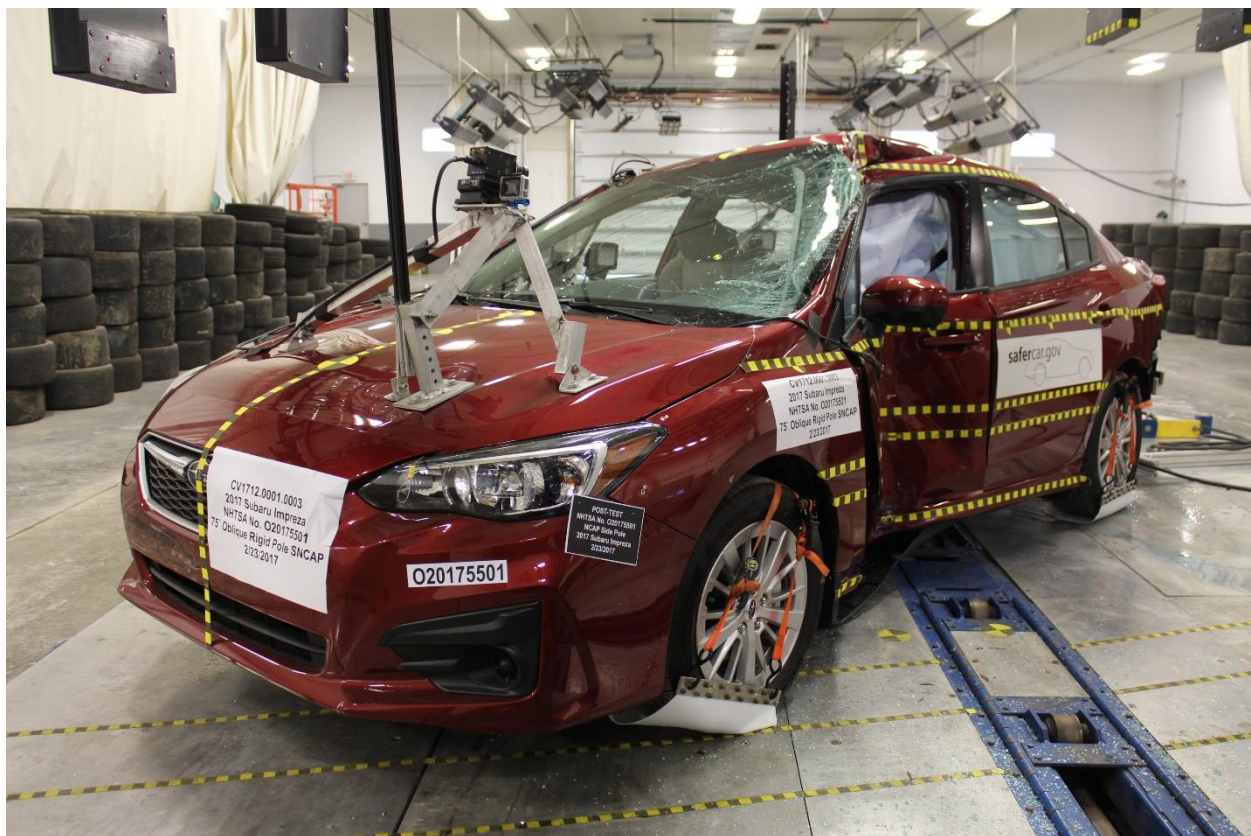


**Figure A-4: Post-Test Frontal View of Test Vehicle**





**Figure A-5: Pre-Test Left Front  $\frac{3}{4}$  View of Test Vehicle**



**Figure A-6: Post-Test Left Front  $\frac{3}{4}$  View of Test Vehicle**





**Figure A-7: Pre-Test Left Side View of Test Vehicle**



**Figure A-8: Post-Test Left Side View of Test Vehicle**



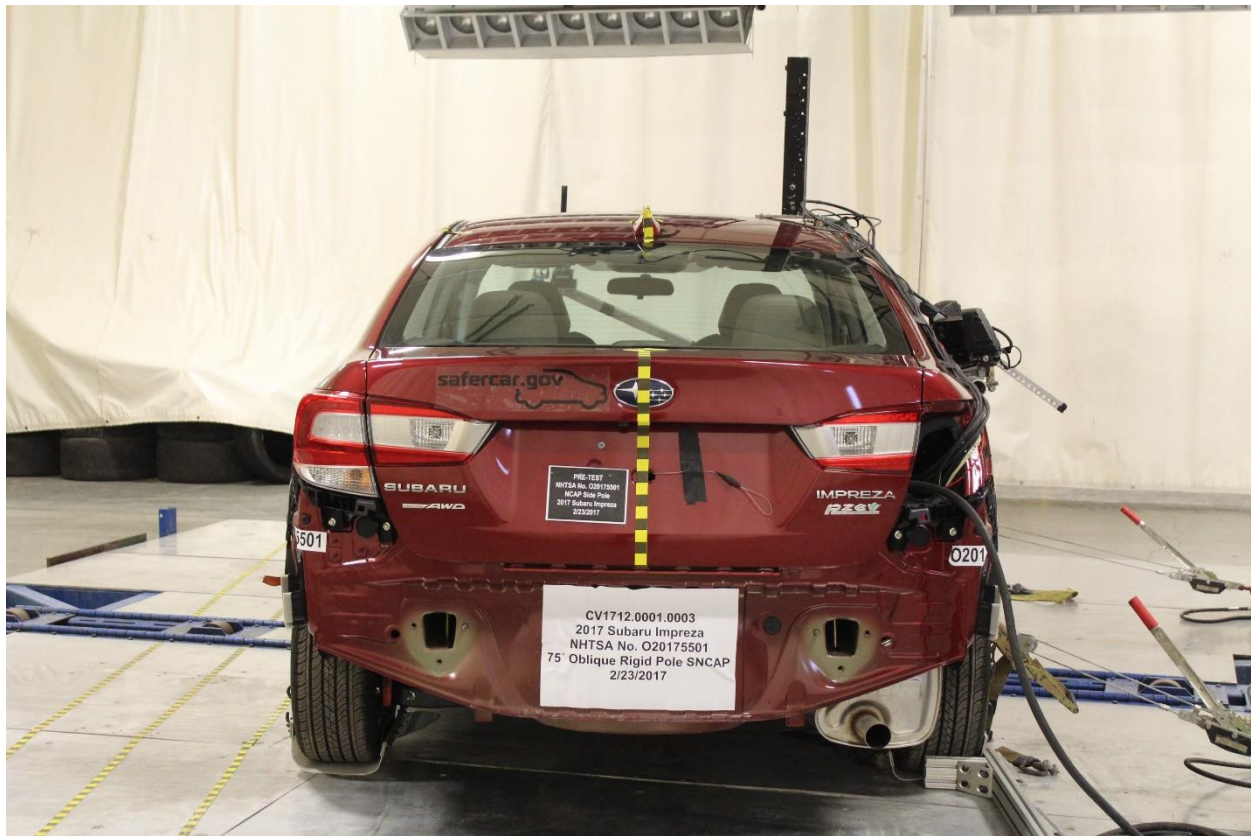


**Figure A-9: Pre-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle**



**Figure A-10: Post-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle**



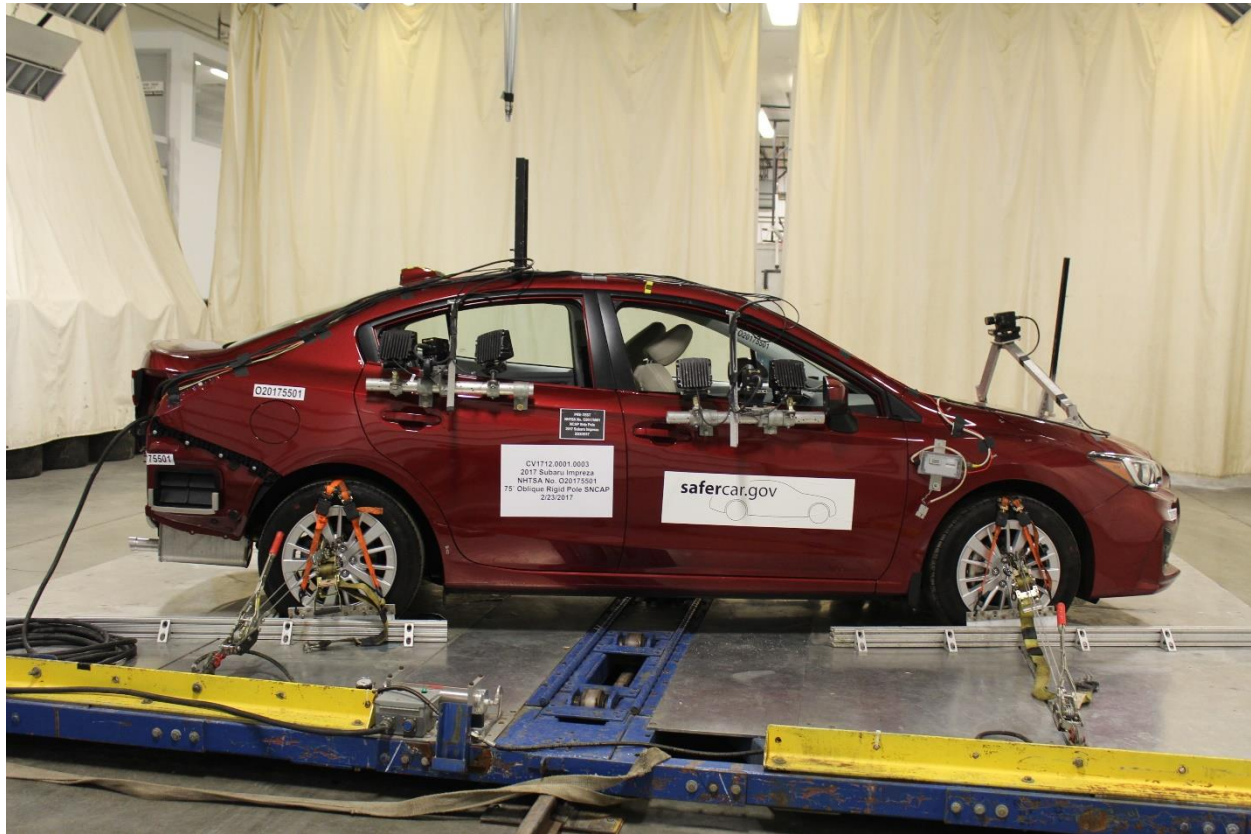


**Figure A-11: Pre-Test Rear View of Test Vehicle**



**Figure A-12: Post-Test Rear View of Test Vehicle**



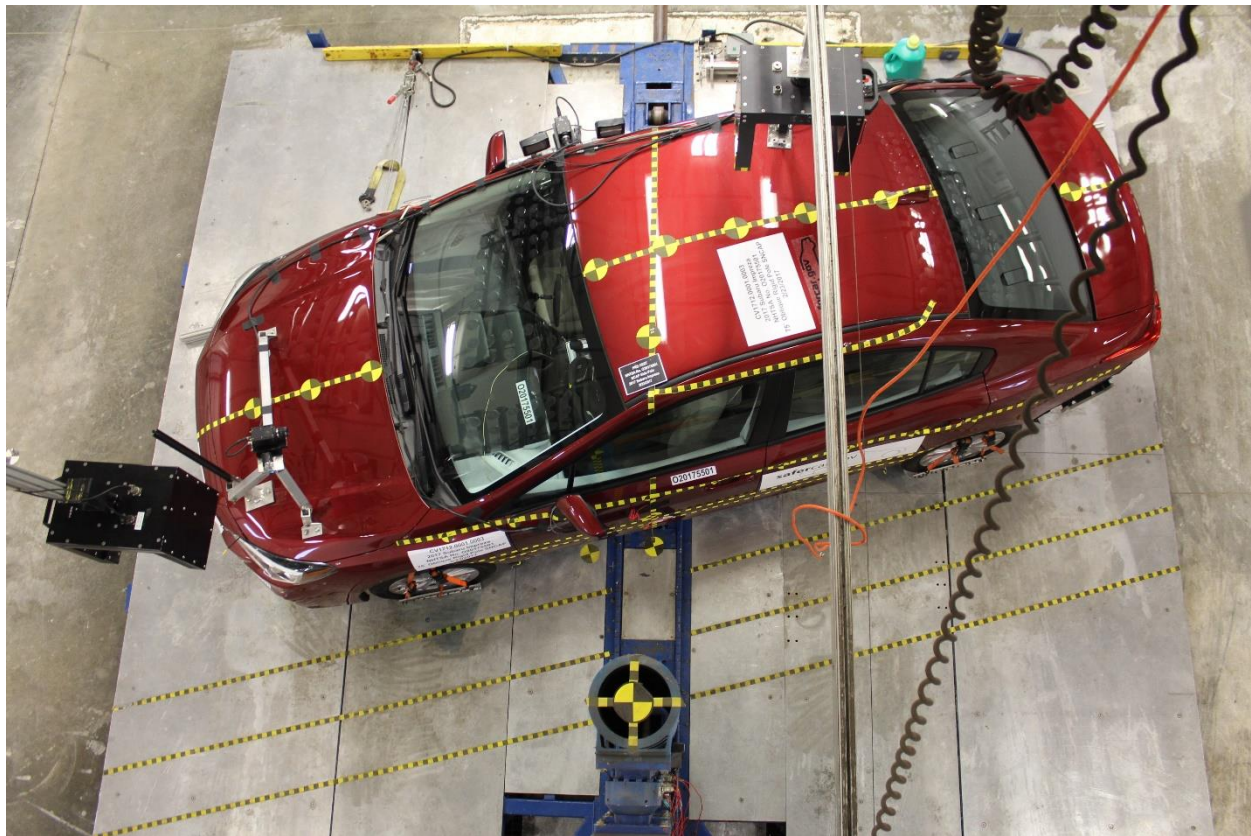


**Figure A-13: Pre-Test Right Side View of Test Vehicle**

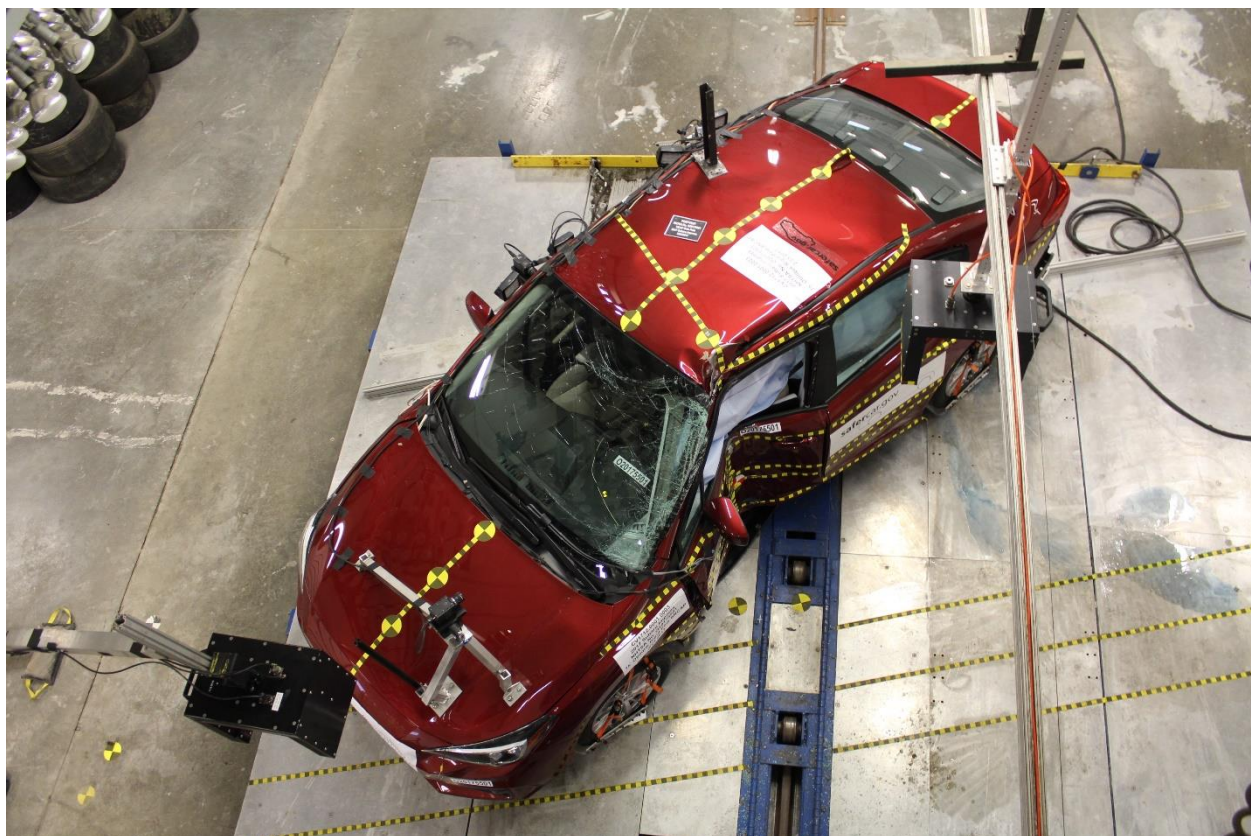


**Figure A-14: Post-Test Right Side View of Test Vehicle**





**Figure A-15: Pre-Test Overhead View of Test Area**



**Figure A-16: Post-Test Overhead View of Test Area**





**Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle**



**Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle**





Figure A-19: Pre-Test Close-Up View of Impact Point Target

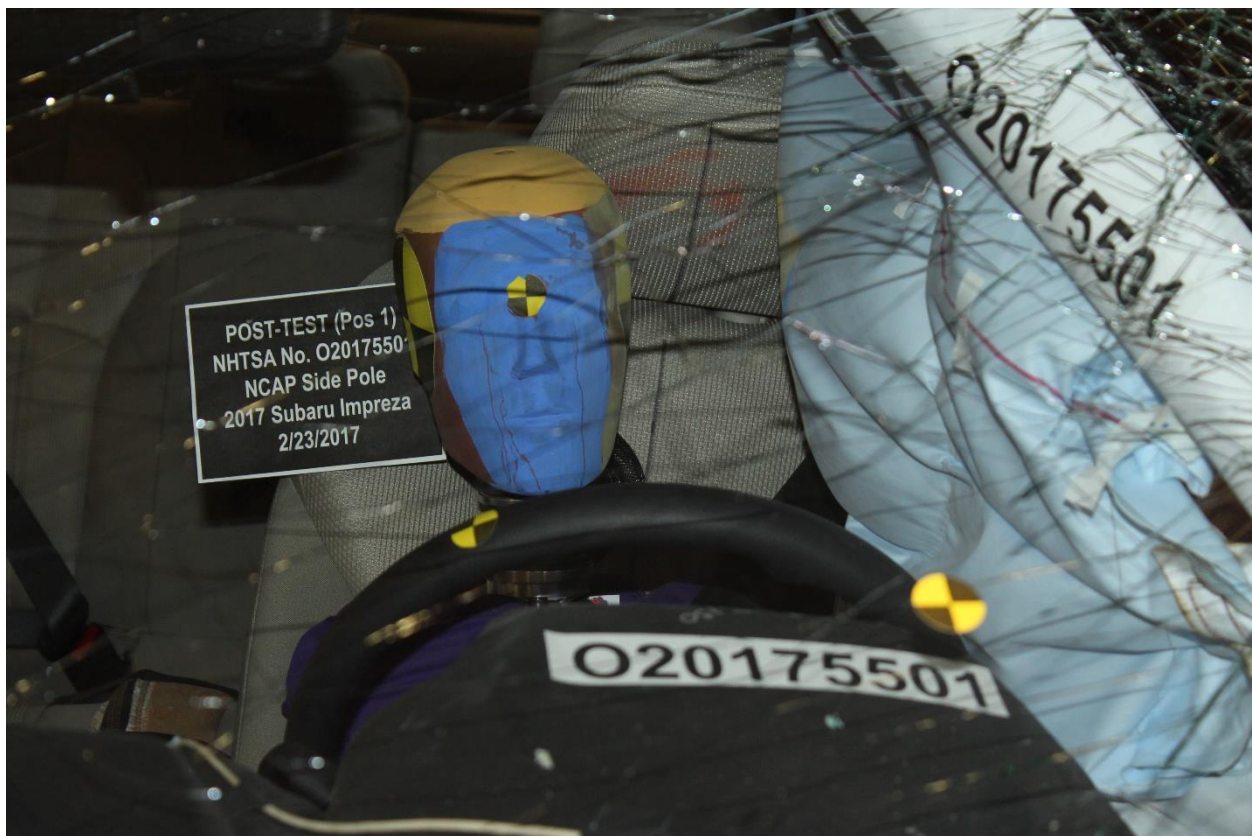


Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location





**Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest**



**Figure A-22: Post-Test Front Close-Up View of Dummy**





**Figure A-23: Pre-Test Left Side View of Dummy Showing Belt and Chalking**



**Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View**





**Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View**



**Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning**





**Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint**



**Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning**



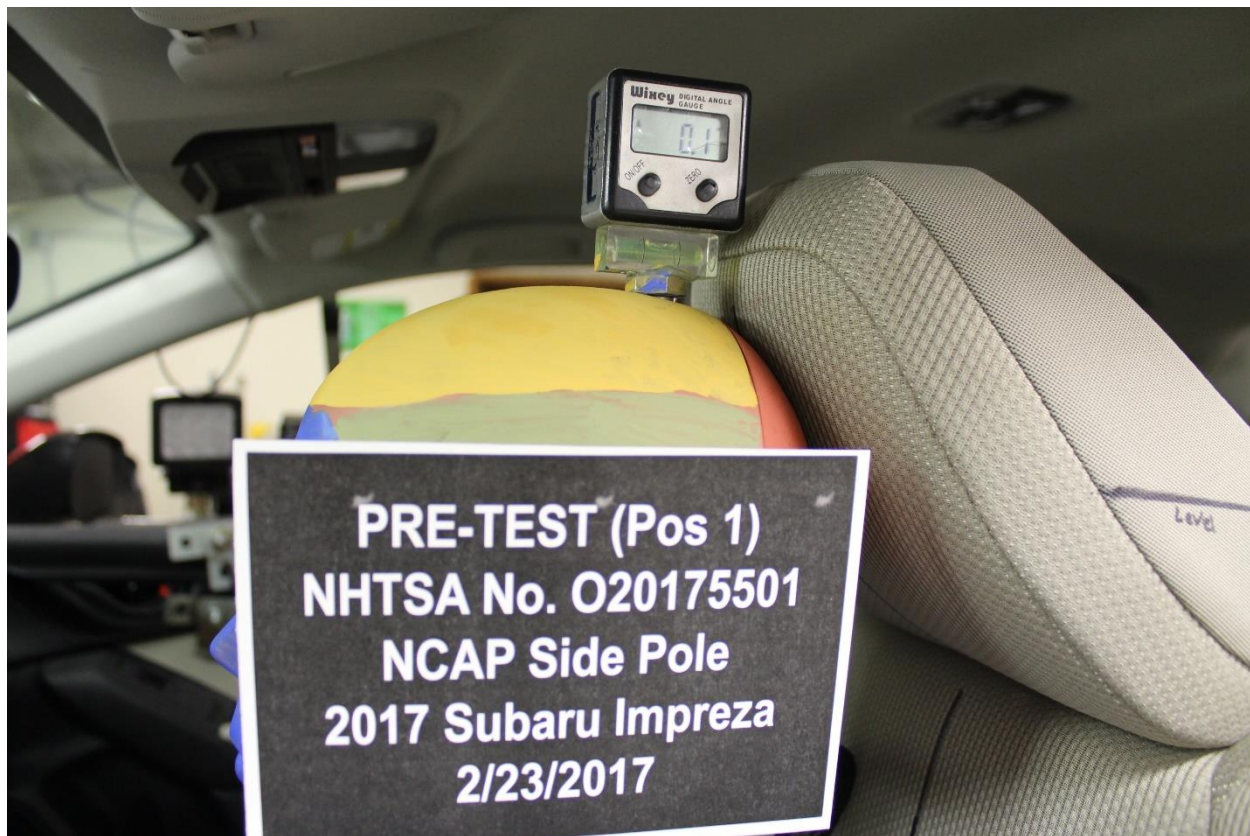


**Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan**



**Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket**





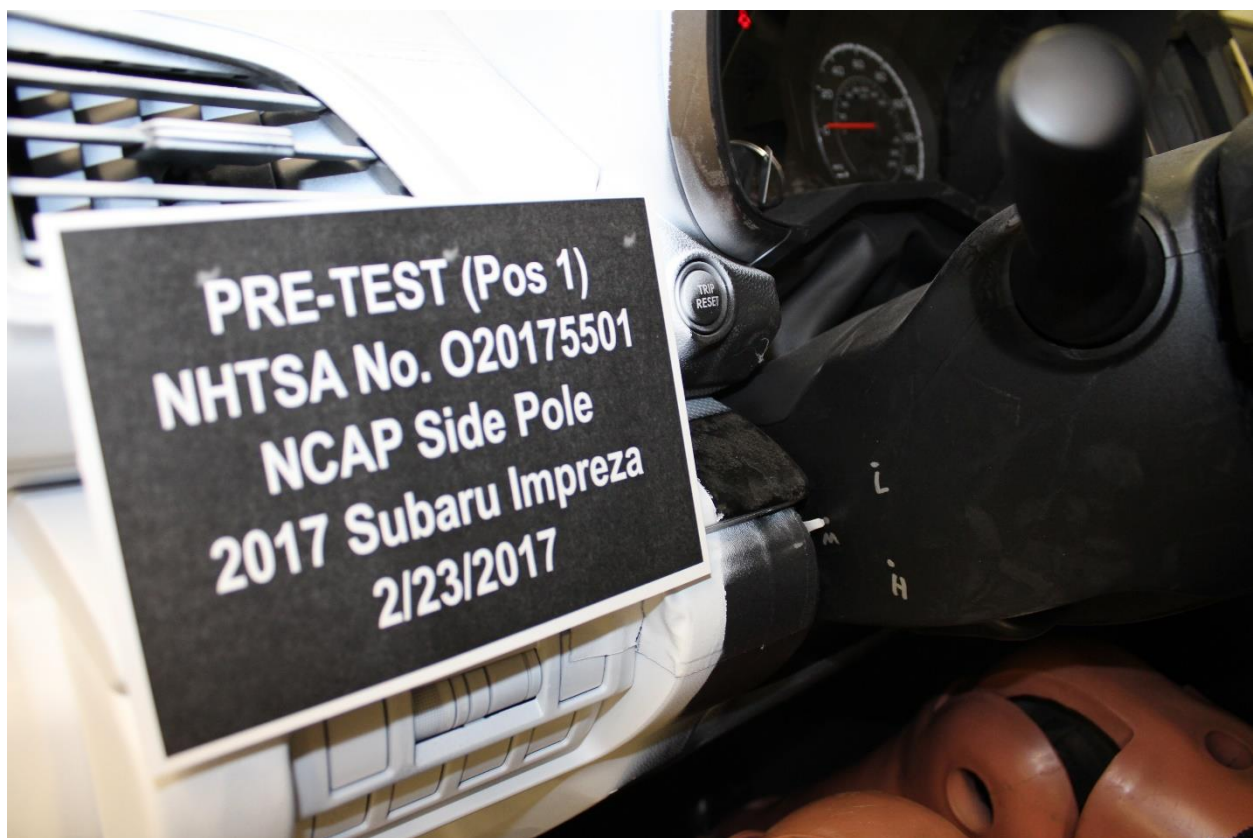
**Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level**



**Figure A-32: Pre-Test Placement of Dummy's Feet**



**Figure A-33: Pre-Test View of Belt Anchorage for Dummy**



**Figure A-34: Pre-Test Left Side View of Steering Wheel**





**Figure A-35: Pre-Test View of Disengaged Parking Brake**

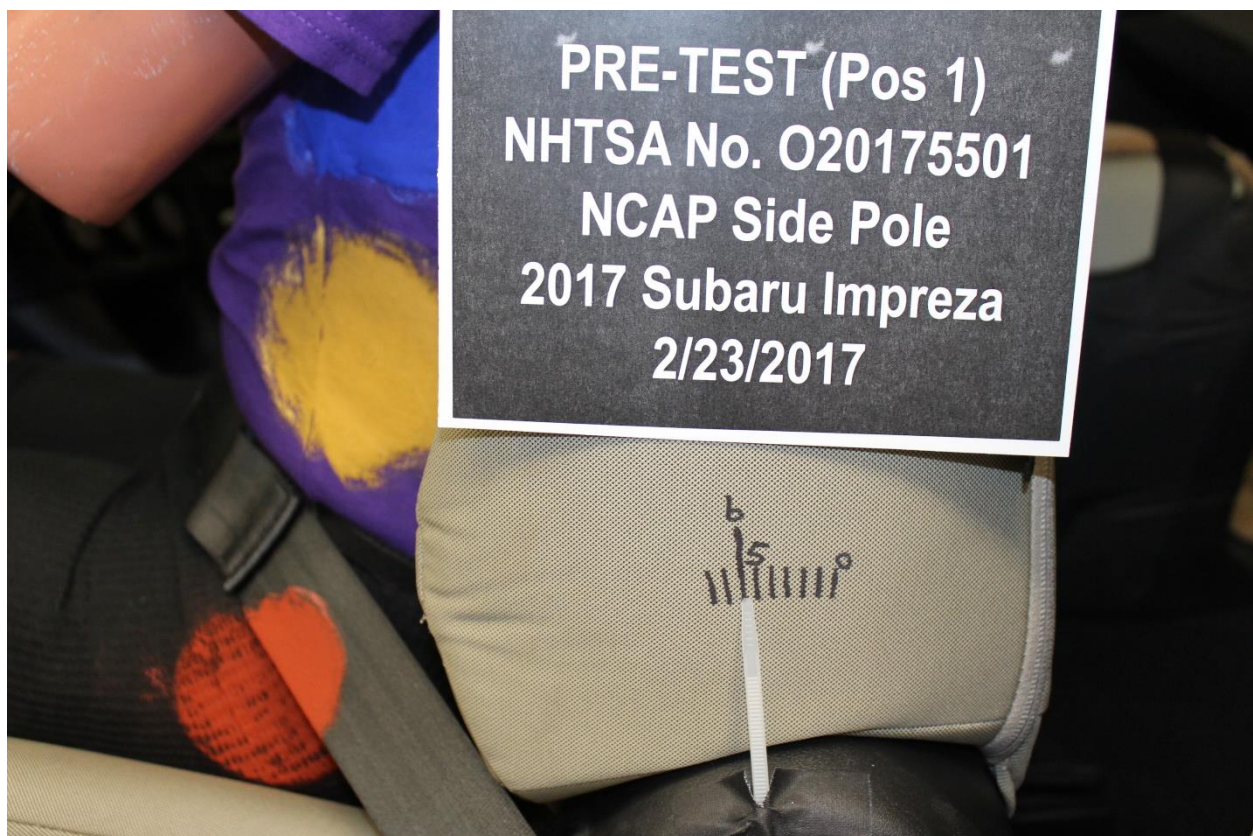


**Figure A-36: Pre-Test View of Parking Brake**





**Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track**



**Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back**





**Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint**

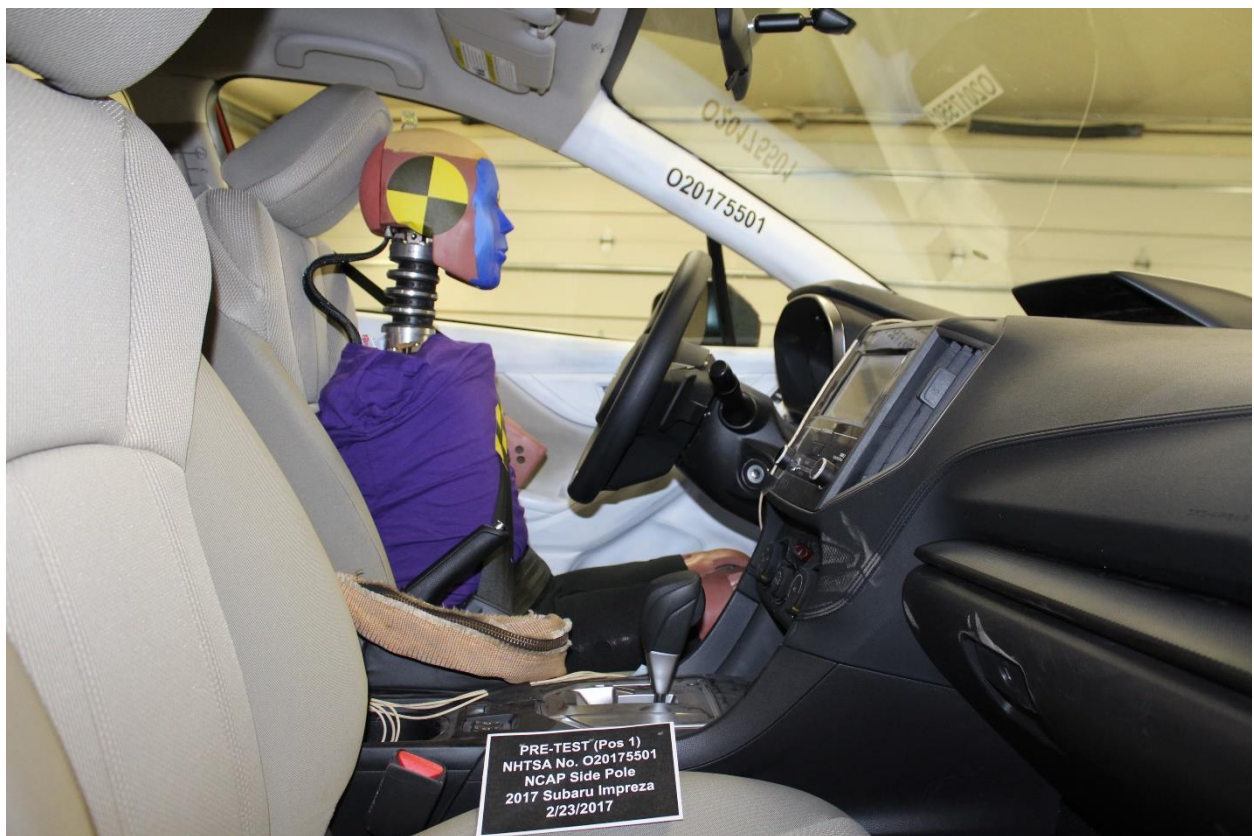


**Figure A-40: Pre-Test Dummy and Door Clearance View**





**Figure A-41: Post-Test Dummy and Door Clearance View**

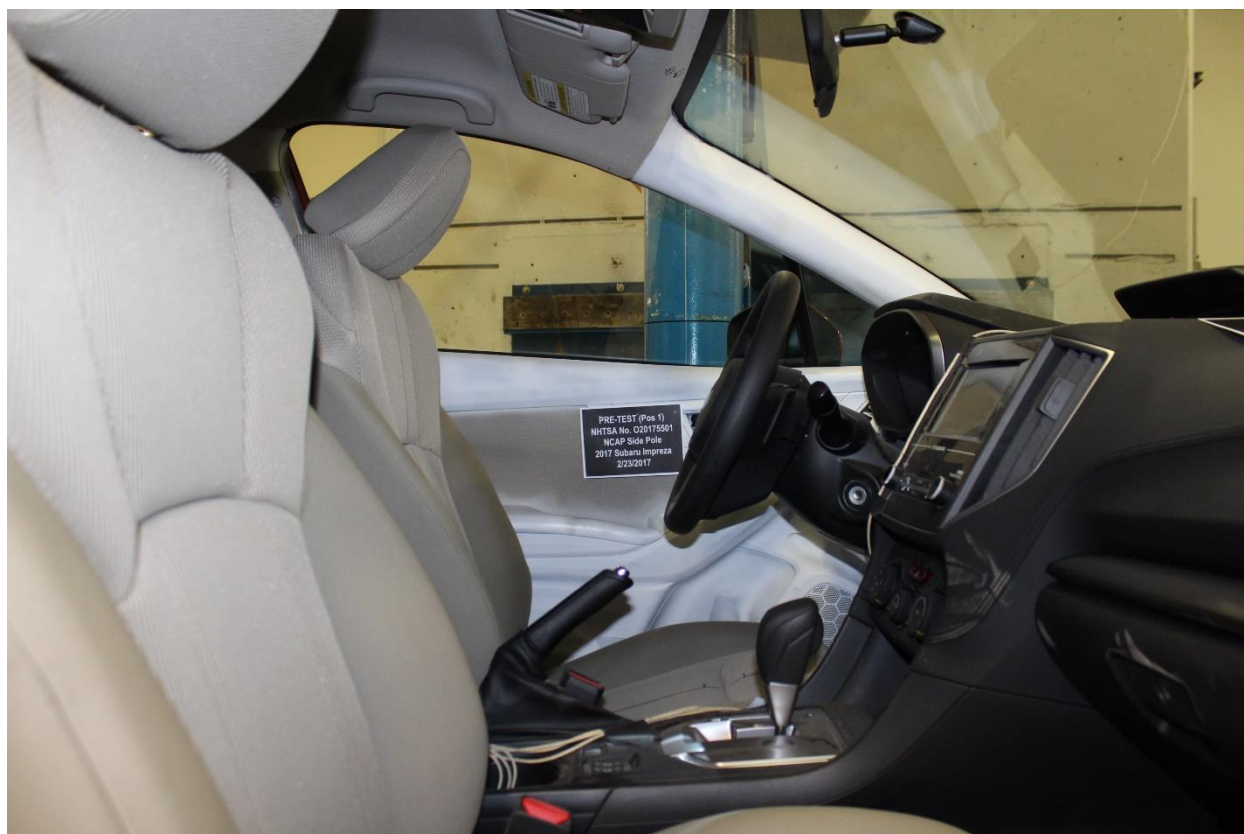


**Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment**





**Figure A-43: Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment**



**Figure A-44: Pre-Test Inner Door Panel View**





**Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location**



**Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View**



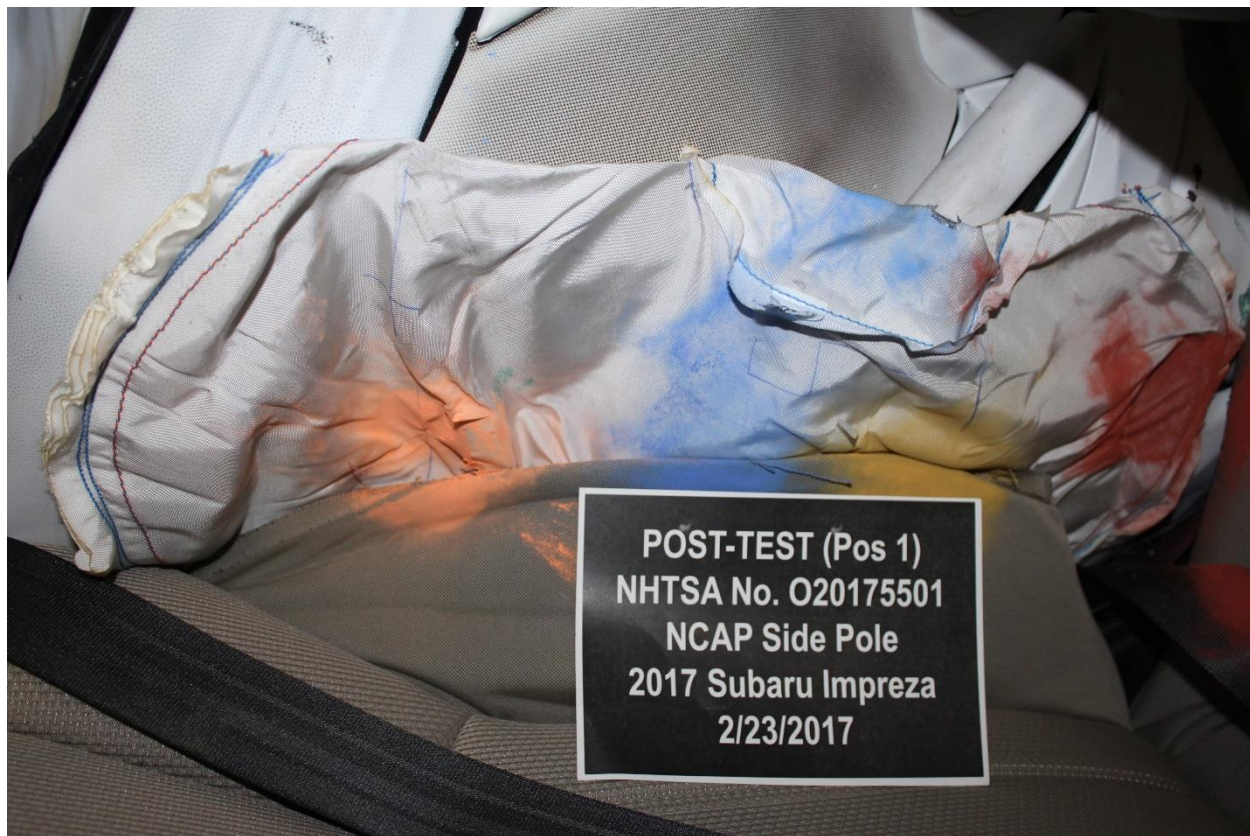


**Figure A-47: Post-Test Dummy Close-Up Head Contact with Side Airbag View**

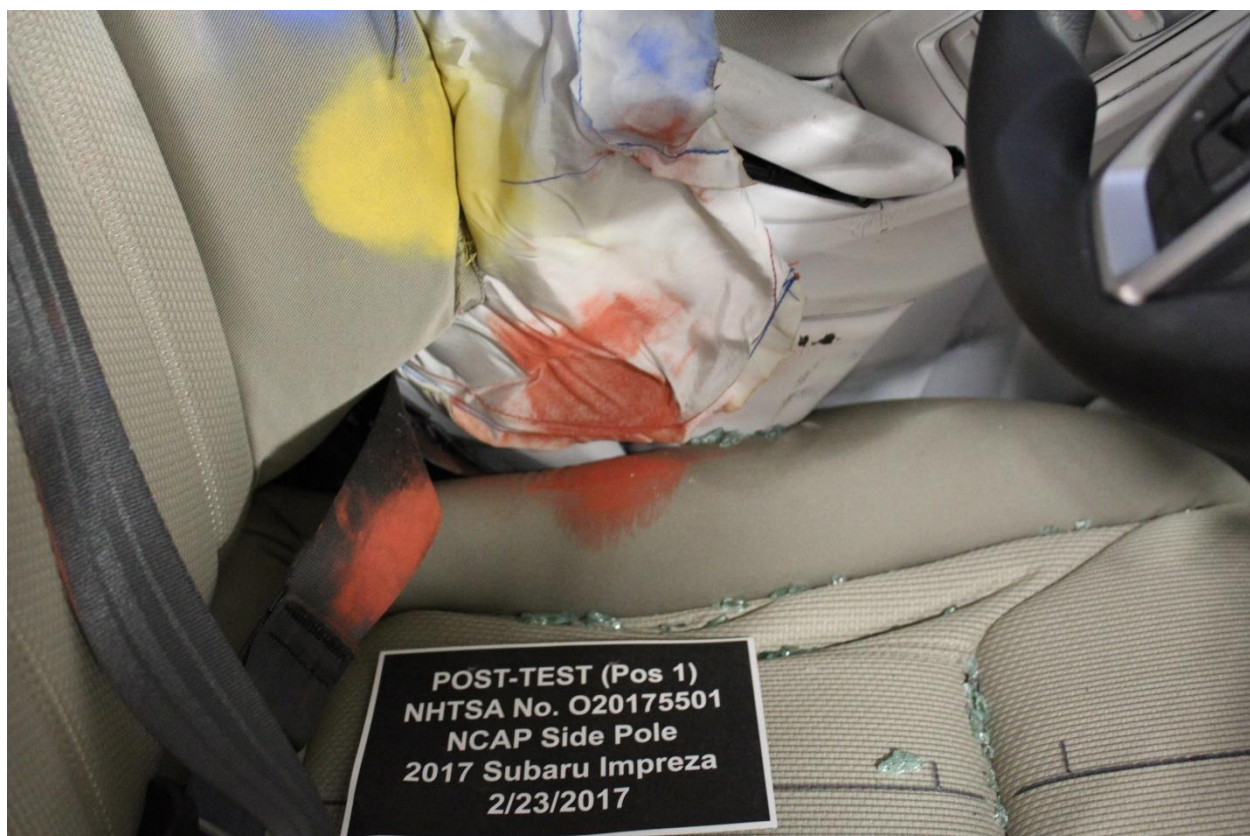


**Figure A-48: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View**



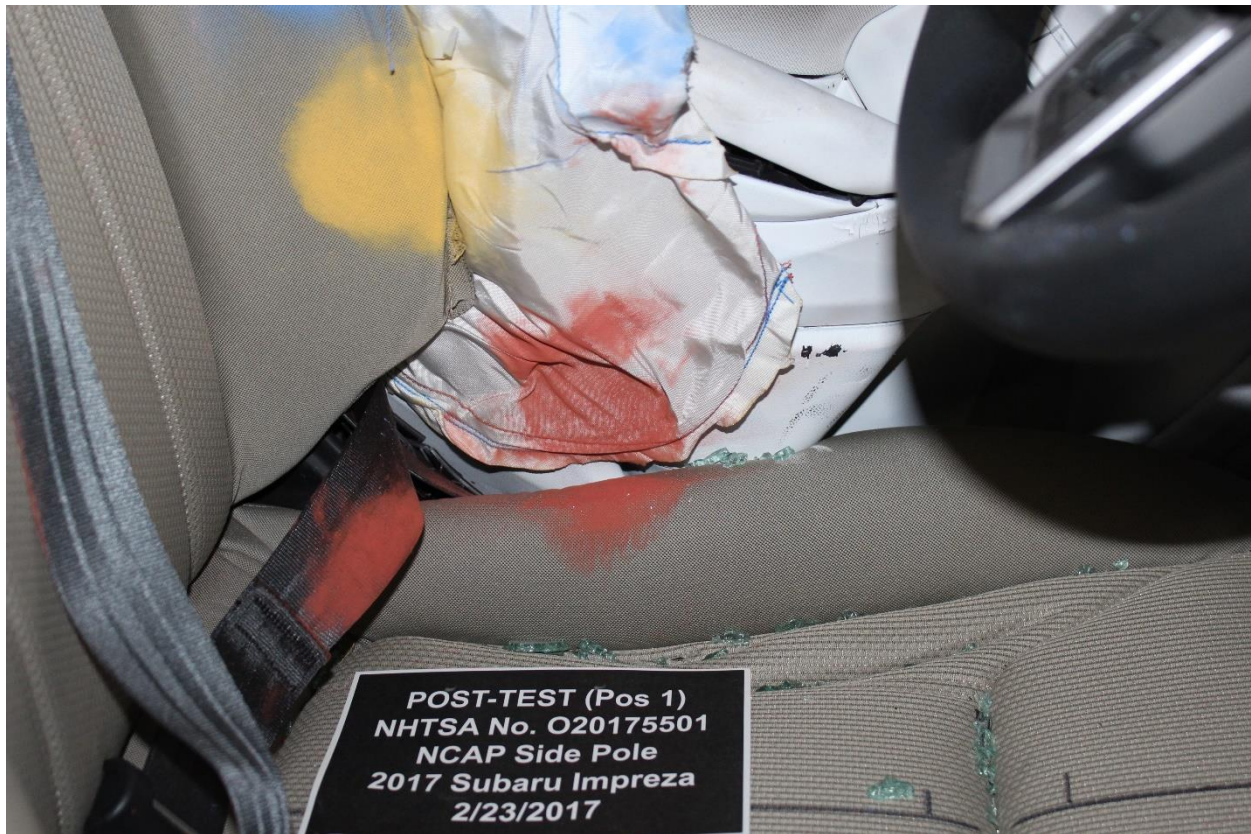


**Figure A-49: Post-Test Dummy Close-Up Torso Contact with Side Airbag View**

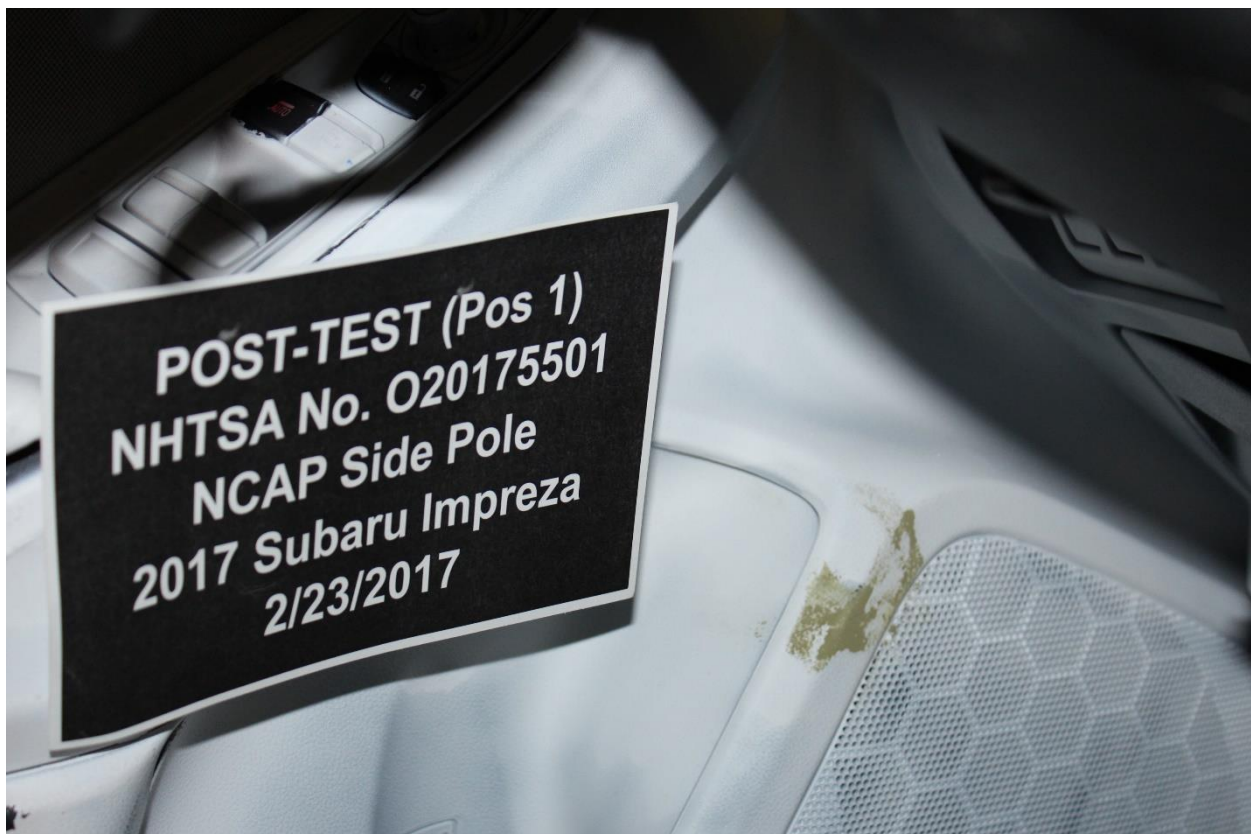


**Figure A-50: Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View**





**Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View**



**Figure A-52: Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View**





**Figure A-53: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck**



**Figure A-54: Post-Test View of Fuel Filler Cap or Fuel Filler Neck**

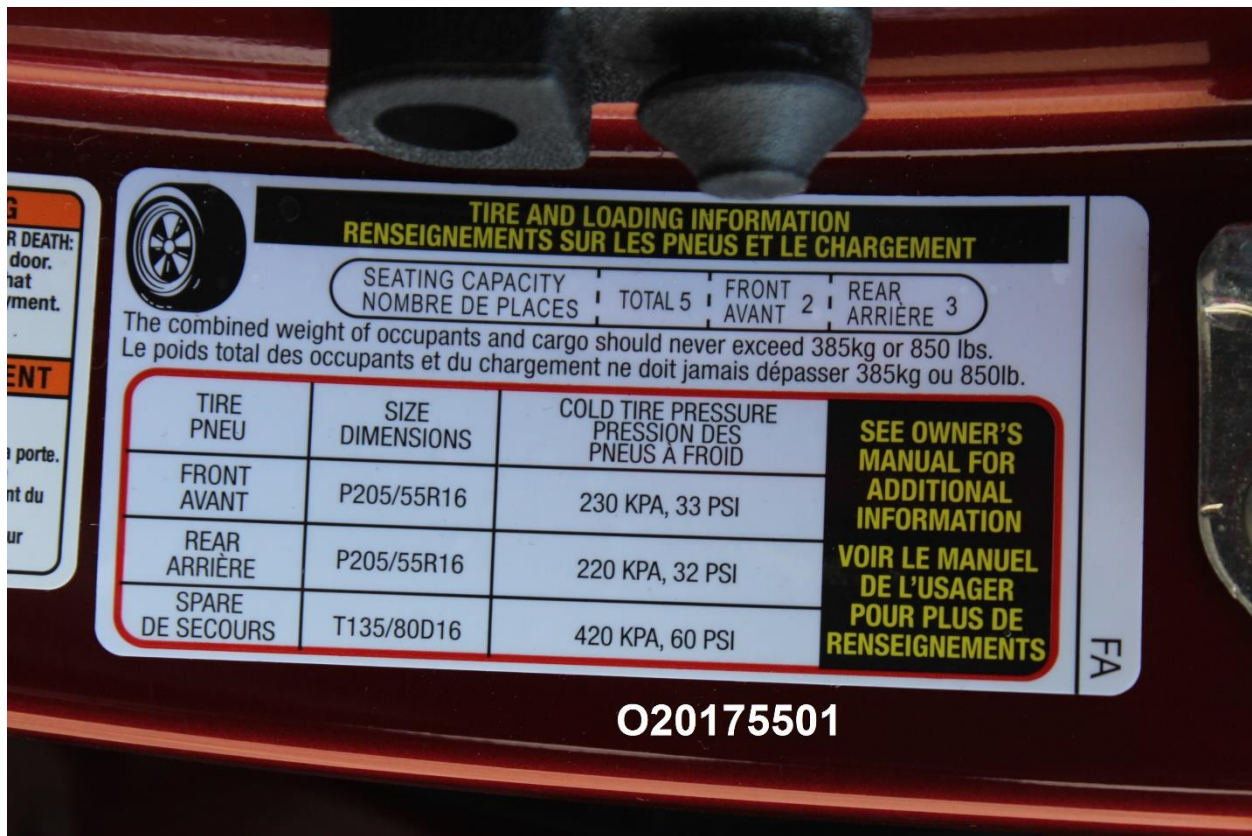


**Figure A-55: Close-Up View of Vehicle's Certification Label**

**Photo Not Applicable**

**Figure A-55a: Close-Up View of Reduced Load Capacity Label**





O20175501

Figure A-56: Close-Up View of Vehicle's Tire Information Placard or Label

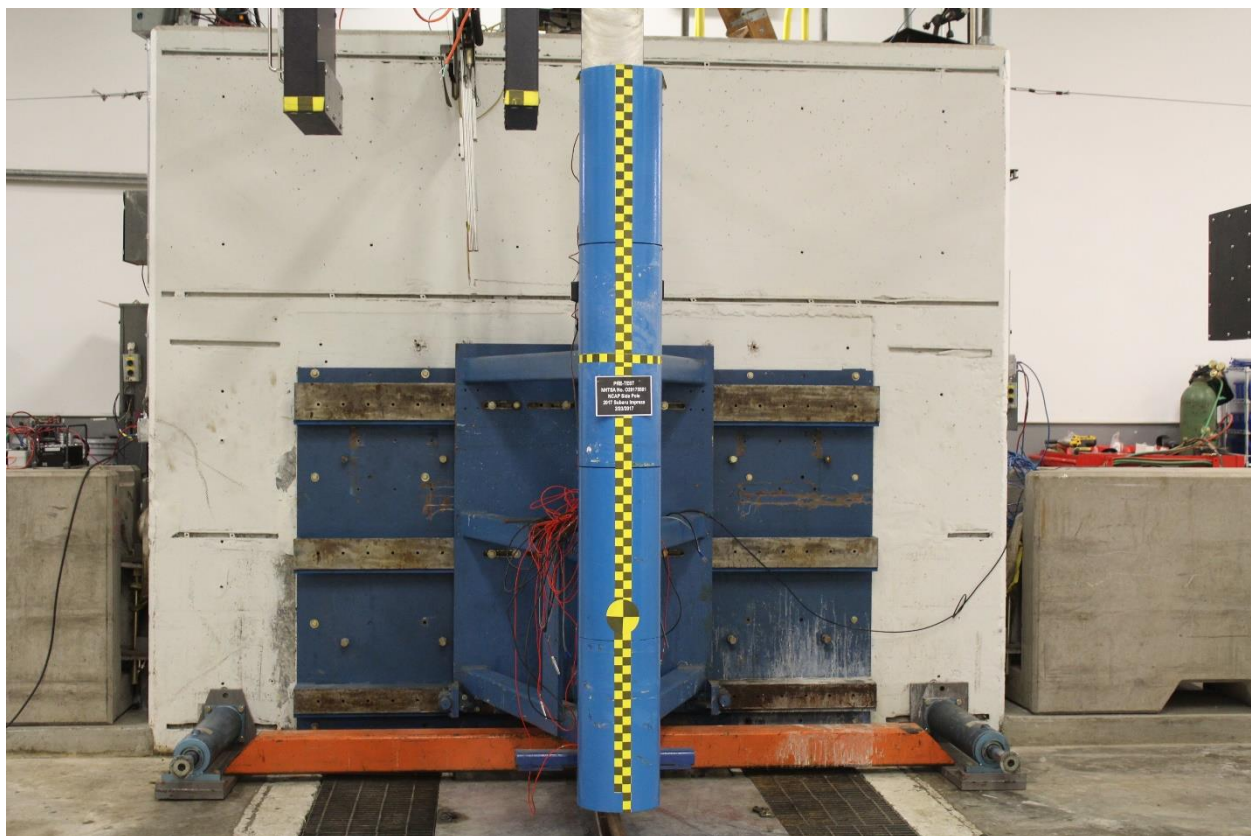
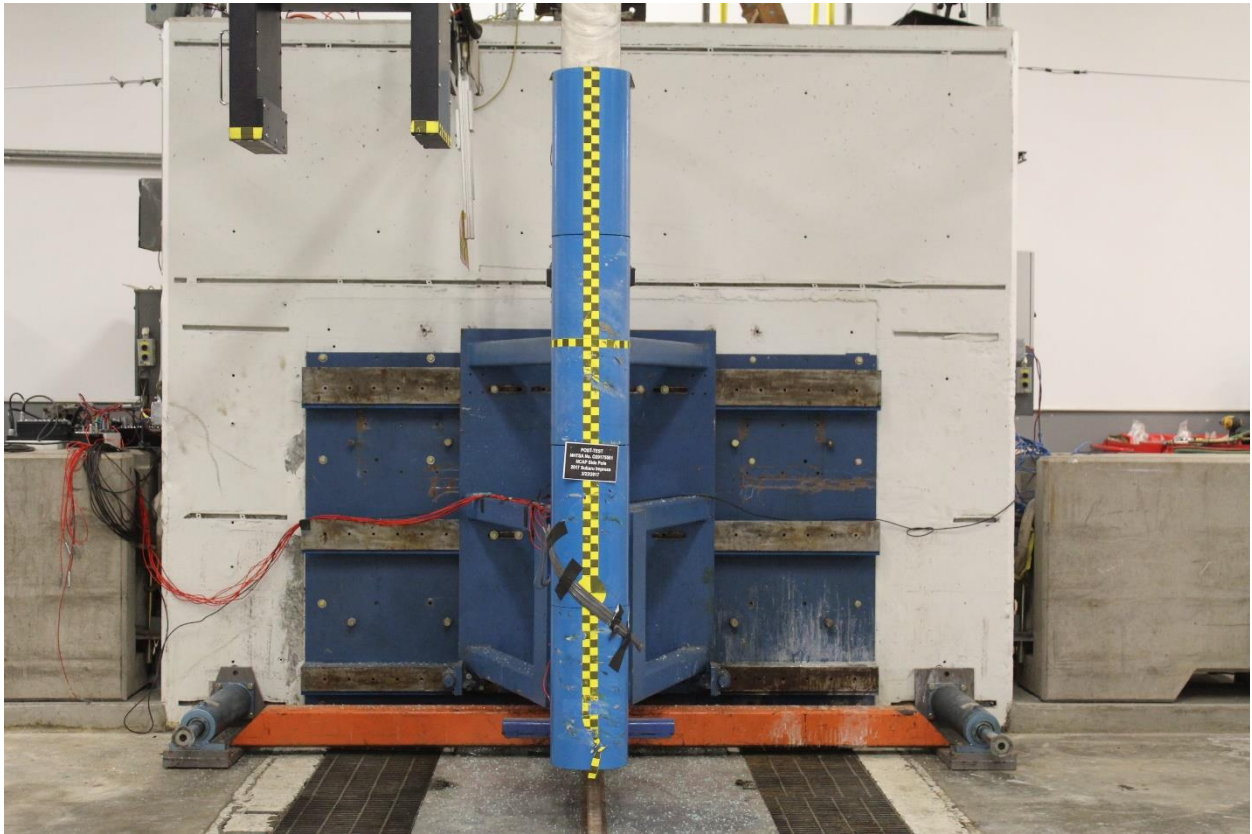
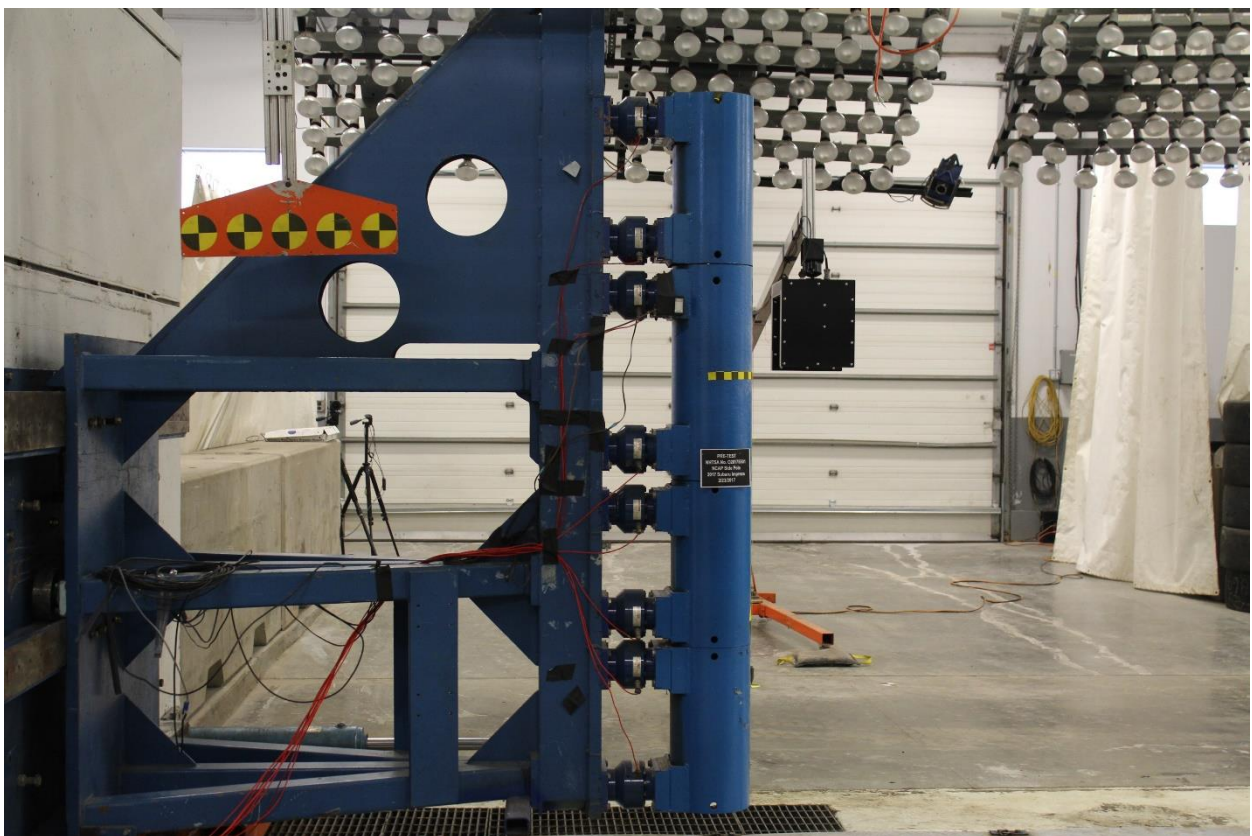


Figure A-57: Pre-Test Pole Barrier Front View



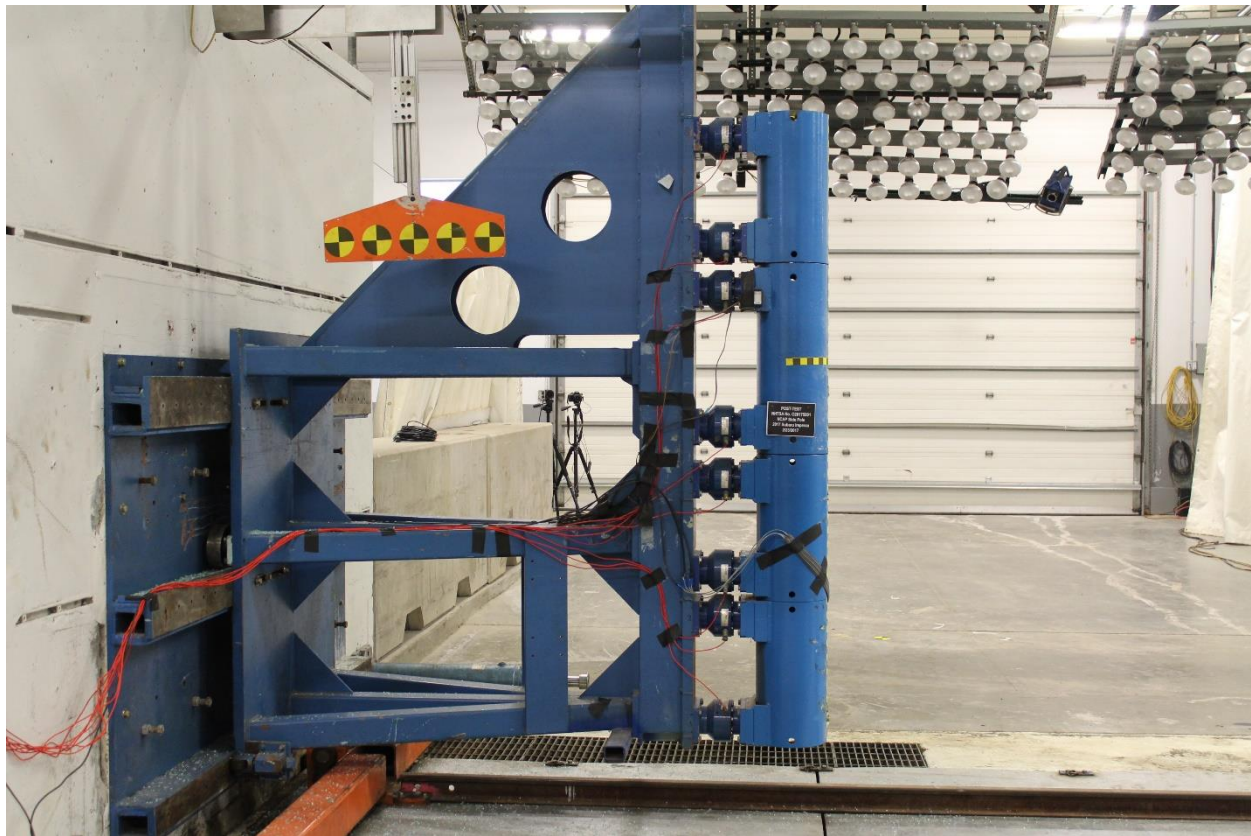


**Figure A-58: Post-Test Pole Barrier Front View**

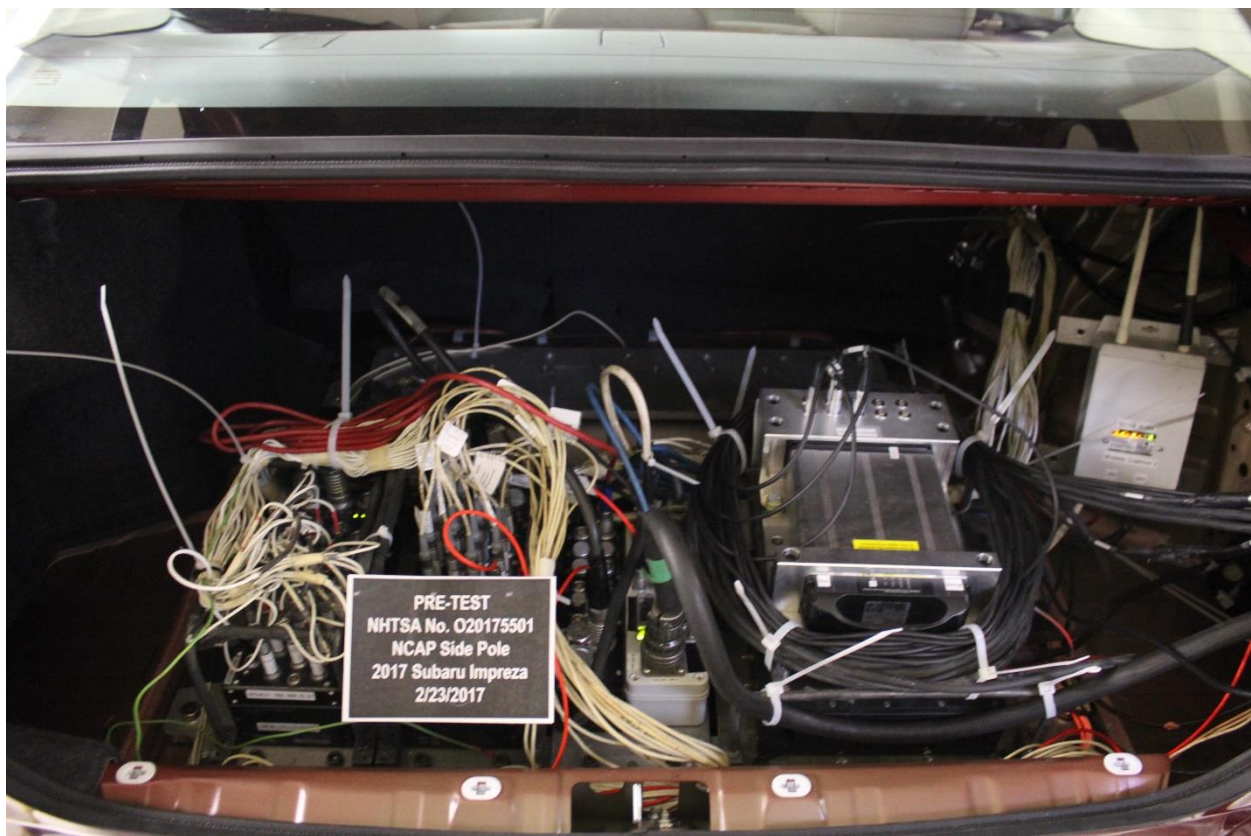


**Figure A-59: Pre-Test Pole Barrier Side View**





**Figure A-60: Post-Test Pole Barrier Side View**



**Figure A-61: Pre-Test Ballast View**

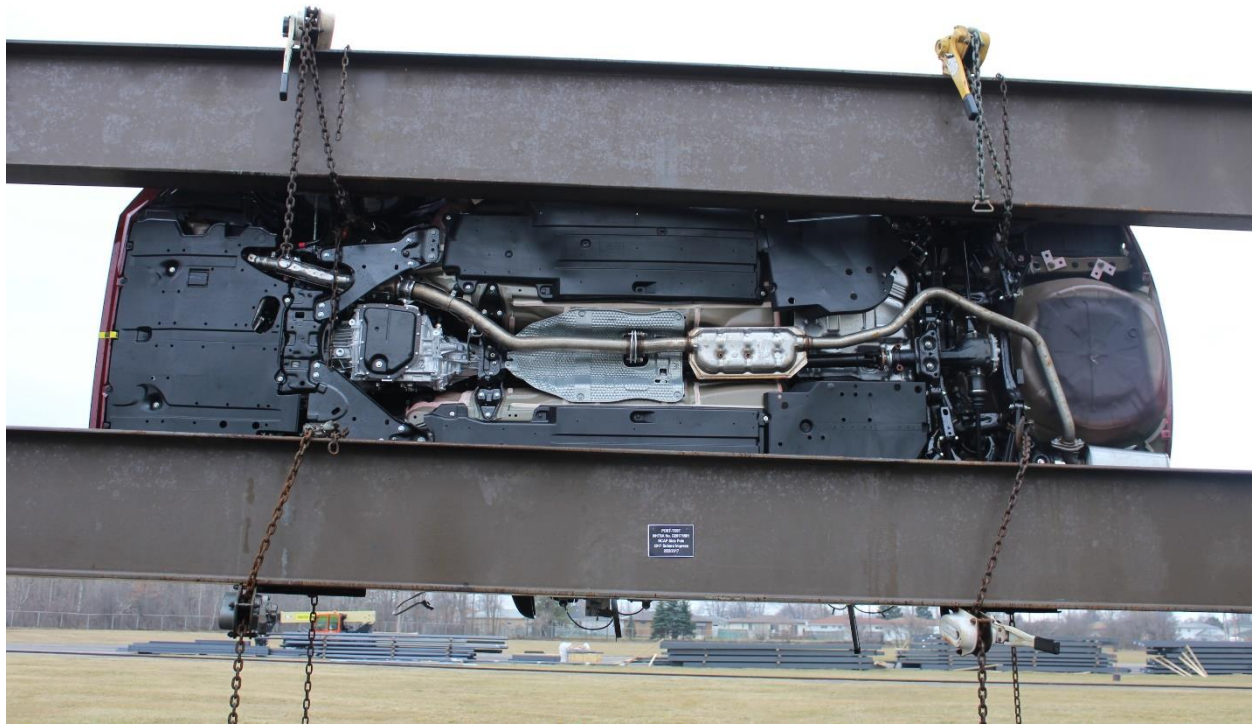




**Figure A-62: Post-Test Primary and Redundant Speed Trap Read-Out**



**Figure A-63: FMVSS No. 301 Static Rollover 0 Degrees**



**Figure A-64: FMVSS No. 301 Static Rollover 90 Degrees**



**Figure A-65: FMVSS No. 301 Static Rollover 180 Degrees**





**Figure A-66: FMVSS No. 301 Static Rollover 270 Degrees**




**Figure A-67: FMVSS No. 301 Static Rollover 360 Degrees**





Figure A-68: Impact Event



**SUBARU**  
Confidence in Motion

VIN: 4S3GKAB64H3801583  
Model/Code: 2017 Subaru Impreza 2.0i Premium/HJD  
Exterior Color: Venetian Red Pearl  
Port / Assembly: Boston, MA  
Deliver by / Carrier: Diversified Automotive, Inc.

SHIP TO: 020283  
Northtown HYUNDAI-SUBARU  
3675 Sheridan Drive  
Amherst, NY 14226

SOLD TO: 020283  
Northtown HYUNDAI-SUBARU  
3675 Sheridan Drive  
Amherst, NY 14226

## IMPREZA®

### GOVERNMENT 5-STAR SAFETY RATINGS

**Overall Vehicle Score** NOT RATED  
Based on the combined ratings of frontal, side, and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver Passenger	NOT RATED
Side Crash	Front Seat Rear Seat	NOT RATED
Rollover		NOT RATED

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.  
Source: National Highway Traffic Safety Administration (NHTSA)  
www.safercar.gov or 1-888-327-4235

### Protect Your Investment!

**Subaru Added Security™**  
The Only Extended Service Agreement Backed By Subaru

- Protection designed to fit your driving needs, up to 7 years/100,000 miles of coverage
- Maintenance plans also available
- We use Genuine Subaru replacement parts - only the best
- We use technicians trained by Subaru - those who know your vehicle best
- Towing, rental and trip interruption benefits available
- Transferable to the next owner
- Ask your sales representative for more details

Accept nothing less than Added Security®

### STANDARD EQUIPMENT

**SAFETY**  
Symmetrical All-Wheel Drive (AWD)  
Vehicle Dynamics Control (VDC)  
Subaru Advanced Frontal Airbag System  
Front Seat Side-Impact Airbags  
Side-Curtain Airbags  
Driver's Side Knee Airbag  
Safety Prolong System  
4-Wheel Disc Brakes w/Brake Assist  
Anti-Lock Braking System (ABS)  
Rear Vision Camera  
Tire Pressure Monitoring System (TPMS)  
Ring-Shape Reinforcement Frame Design  
Anti-Theft Alarm & Immobilizer System  
Daytime Running Lights (DRL)

**PERFORMANCE AND EXTERIOR**  
2.0L Horizontally-Opposed DOHC Engine  
Continuously Variable Transmission (CVT)  
Body-Color Folding Exterior Mirrors  
Four Wheel Independent Suspension  
16" Alloy Wheels w/ 205/55R16 Tires

**COMFORT, CONVENIENCE AND INTERIOR**  
Air Conditioning w/Air Filtration System  
6.5" STARLINK Multimedia Audio System  
Android Auto & Apple CarPlay  
Bluetooth Hands-Free Phone Connectivity  
USB Port w/ iPod & iPhone Connectivity  
SUBARU STARLINK Safety Plus-1 Yr Free Cruise Control  
Power Door Locks & Dual Power Mirrors  
Remote Keyless Entry System  
Auto-Up/Down Front Door/Pass Windows  
Height Adjustable Driver's Seat  
Tilt-Adjustable Front Seat Headrests  
60/40 Split Fold-Down Rear Seatback  
Multi-Function Trip Computer  
Automatic On/Off Headlights  
Tilt / Telescopic Steering Column  
All-Weather Package w/Heated Front Seats

**LIMITED WARRANTY/ROADSIDE ASSISTANCE**  
3 Years / 36,000 Miles Basic  
5 Years / 60,000 Miles Powertrain  
5 Yrs / Unlimited Mileage Rust Perforation  
3 Yrs / 36,000 24/7 Roadside Assistance  
See Owner Info Kit & Warranty For Details

### OPTIONAL EQUIPMENT AND OTHER ITEMS

Manufacturer's Suggested Retail Price	
Full Tank of Gas	\$21,195.00 INCLD
Standard Option: 11	
Bumper Applique Rear - 4Dr	\$101.00
Splash Guards - 4Dr	\$164.00
ALL WEATHER FLOOR MATS	\$31.00
Cargo Tray - 4Dr	\$31.00

### Fuel Economy and Environment

**Fuel Economy** Midsize cars range from 13 to 136 MPG. You save \$1,250 in fuel costs over 5 years compared to the average new vehicle.

**32 MPG** combined city 28 city 38 highway  
3.1 gallons per 100 miles

**Annual fuel cost \$1,150**

Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only)

This vehicle emits 282 grams CO<sub>2</sub> per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 28 mpg and costs \$1,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.45 per gallon. MPGe is miles per gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov  
Calculate personalized estimates and compare vehicles

### PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:  
U.S./CANADIAN PARTS CONTENT: 40%  
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 45%

FOR THIS VEHICLE:  
FINAL ASSEMBLY POINT: Lafayette, IN  
COUNTRY OF ORIGIN: ENGINE: JAPAN  
TRANSMISSION: JAPAN

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

0\*0277452\*

THIS LABEL HAS BEEN APPLIED PURSUANT TO FEDERAL LAW. DO NOT REMOVE OR ALTER PRIOR TO THE DELIVERY TO THE ULTIMATE PURCHASER.

Figure A-69: Monroney Label

# Photo Not Applicable

**Figure A-70: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual**



**Figure A-71: Post-Test View of Shattered Vehicle Inner Door Panel (if applicable)**



## **APPENDIX B**

### **VEHICLE AND DUMMY RESPONSE DATA PLOTS**

**TABLE OF DATA PLOTS**

**Driver Dummy Instrumentation Plots**

<b>Fig.</b>	<b>Description</b>	<b>Page</b>
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-4
4	Driver Head Resultant Acceleration Primary vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6



The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at [www.NHTSA.dot.gov](http://www.NHTSA.dot.gov).

### **Additional Driver Dummy Instrumentation Data**

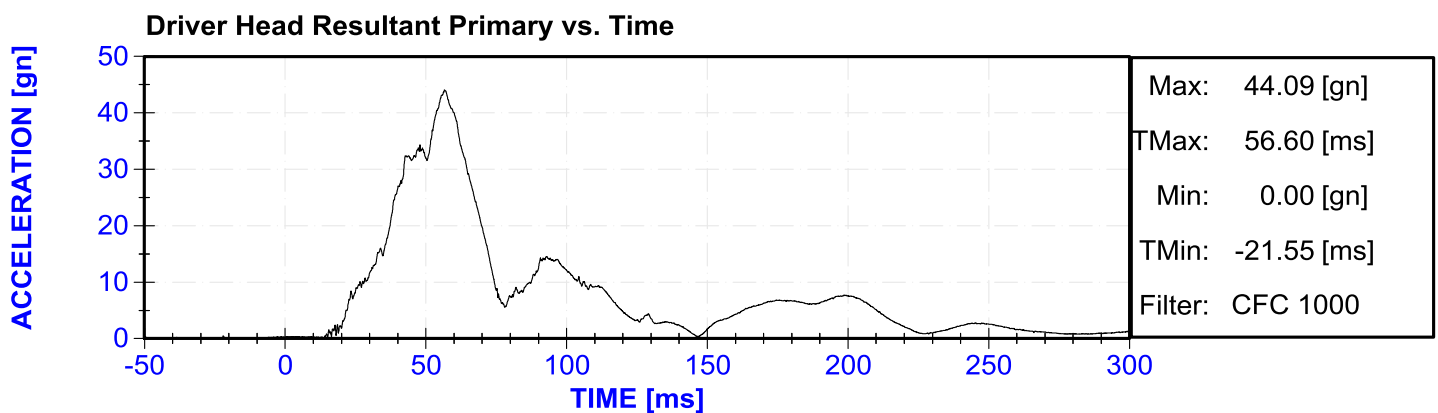
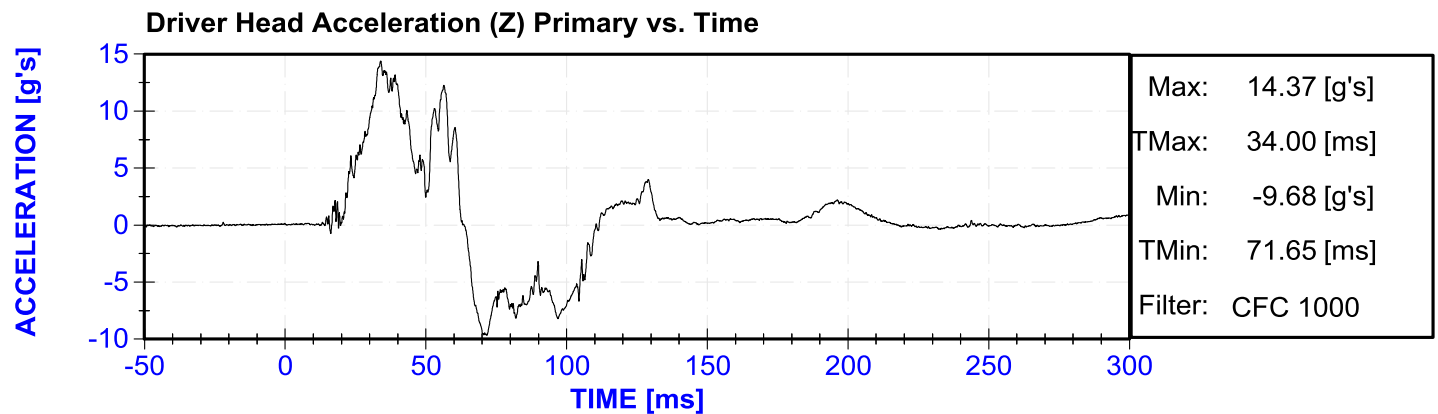
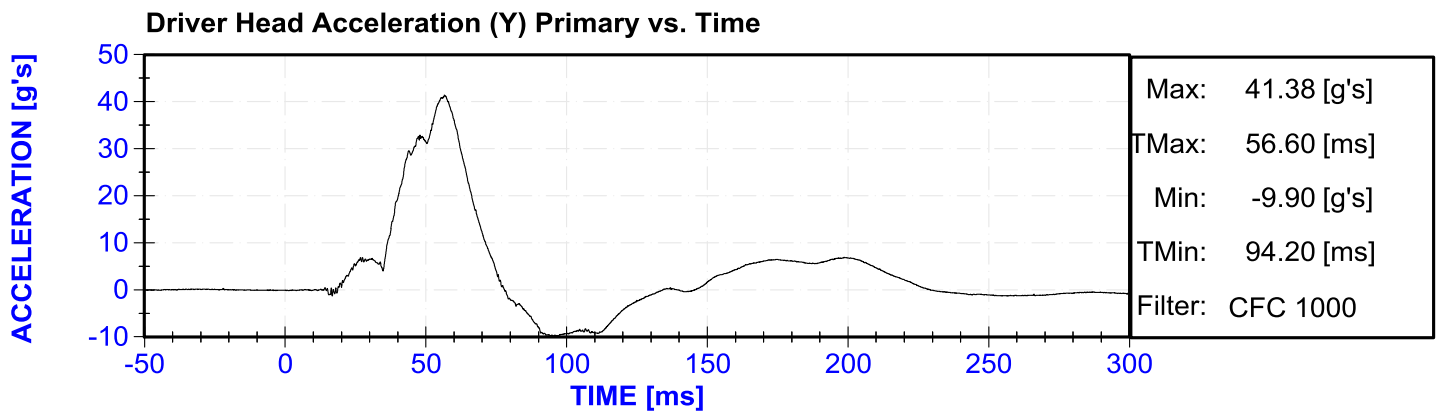
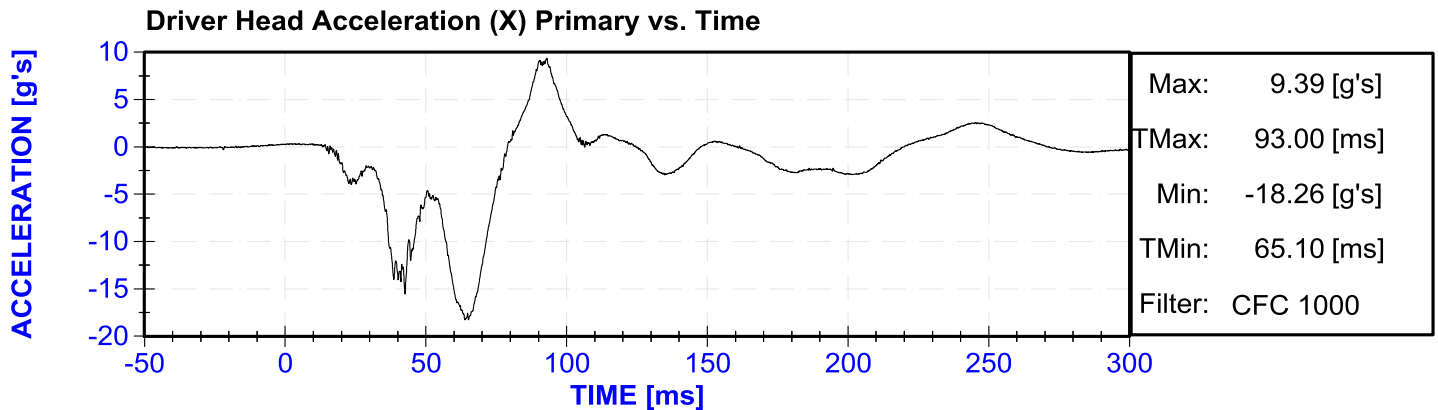
Driver Head Acceleration Redundant (X)  
Driver Head Acceleration Redundant (Y)  
Driver Head Acceleration Redundant (Z)  
Driver Upper Thorax Rib Deflection (Y)  
Driver Middle Thorax Rib Deflection (Y)  
Driver Lower Thorax Rib Deflection (Y)  
Driver Upper Abdomen Rib Deflection (Y)  
Driver Lower Abdomen Rib Deflection (Y)

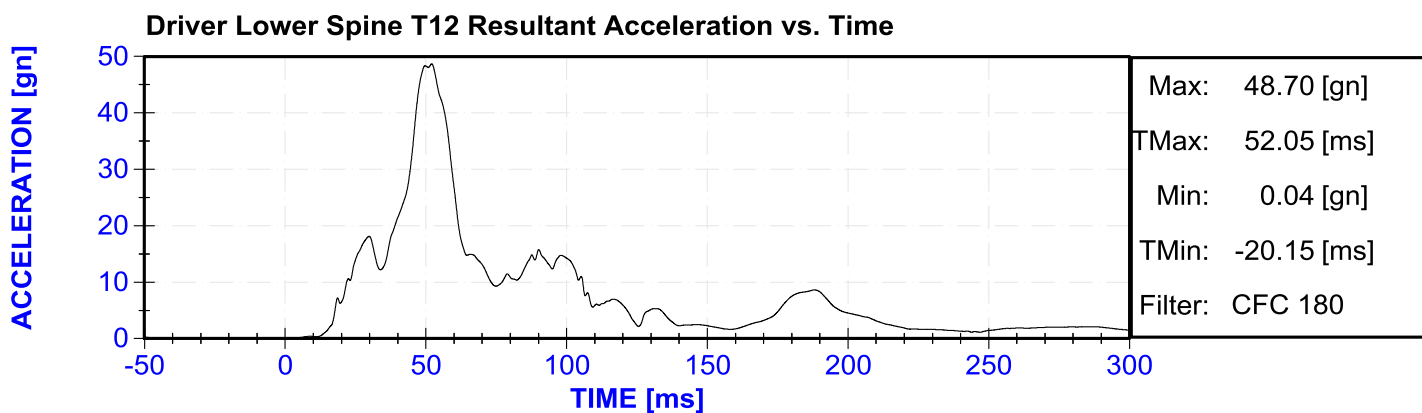
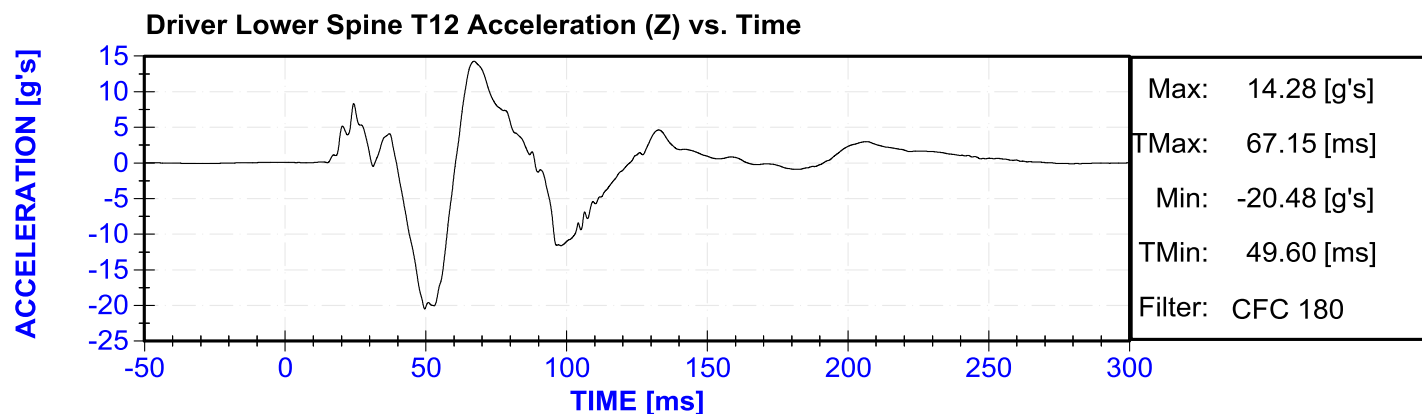
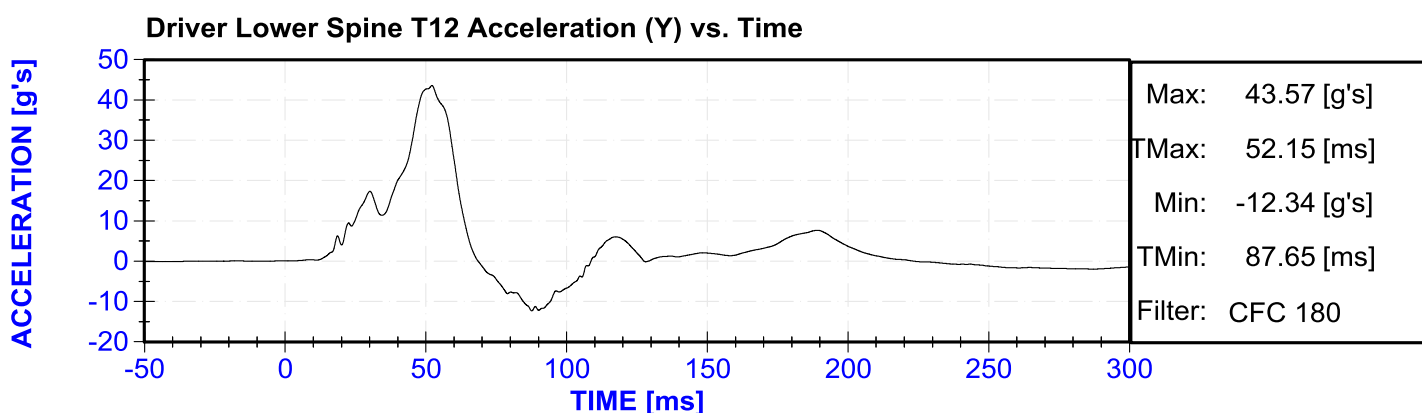
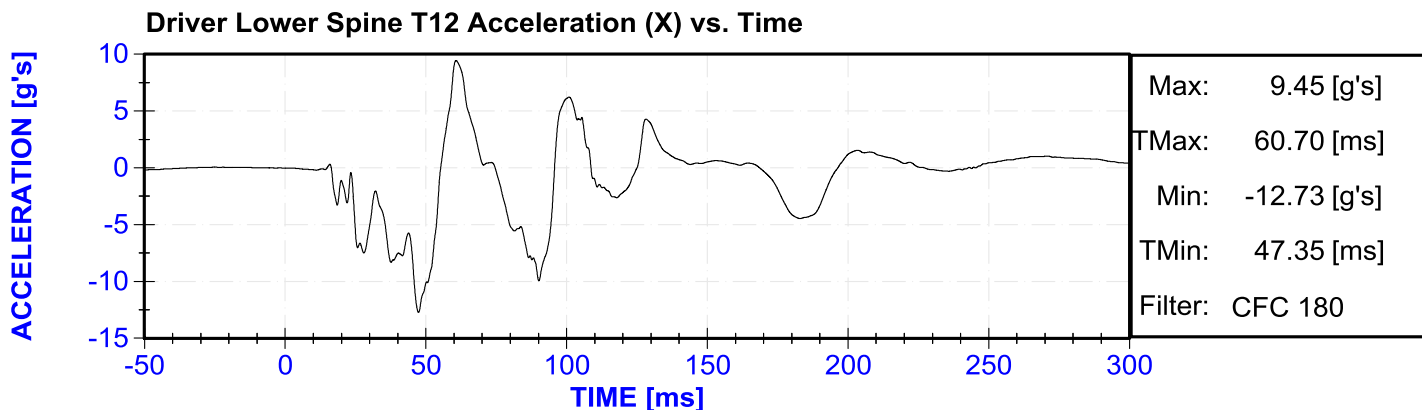
### **Vehicle Instrumentation Data**

Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)  
Left Floor Sill Acceleration (Y)  
Left A-Pillar Sill Acceleration (Y)  
Left Lower A-Pillar Acceleration (Y)  
Left Mid A-Pillar Acceleration (Y)  
Left B-Pillar Sill Acceleration (Y)  
Left Lower B-Pillar Acceleration (Y)  
Left Mid B-Pillar Acceleration (Y)  
Driver Seat Track at Dummy Hip Point Acceleration (Y)  
Engine Top Acceleration (X)  
Engine Top Acceleration (Y)  
Firewall Center Acceleration (Y)  
Right Roof at Vertical Impact Reference Line Acceleration (Y)  
Right Sill at Vertical Impact Reference Line Acceleration (Y)  
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)  
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

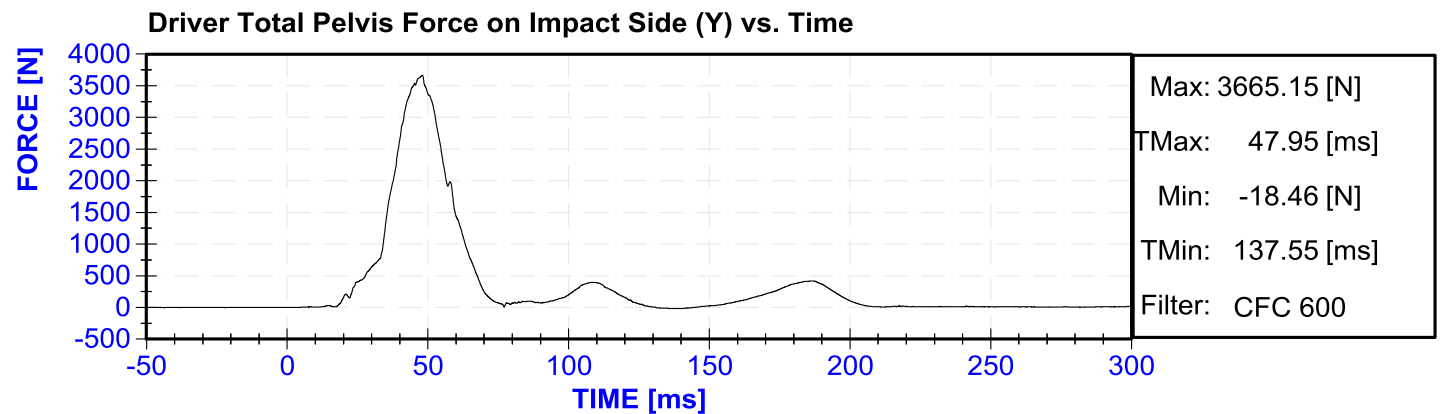
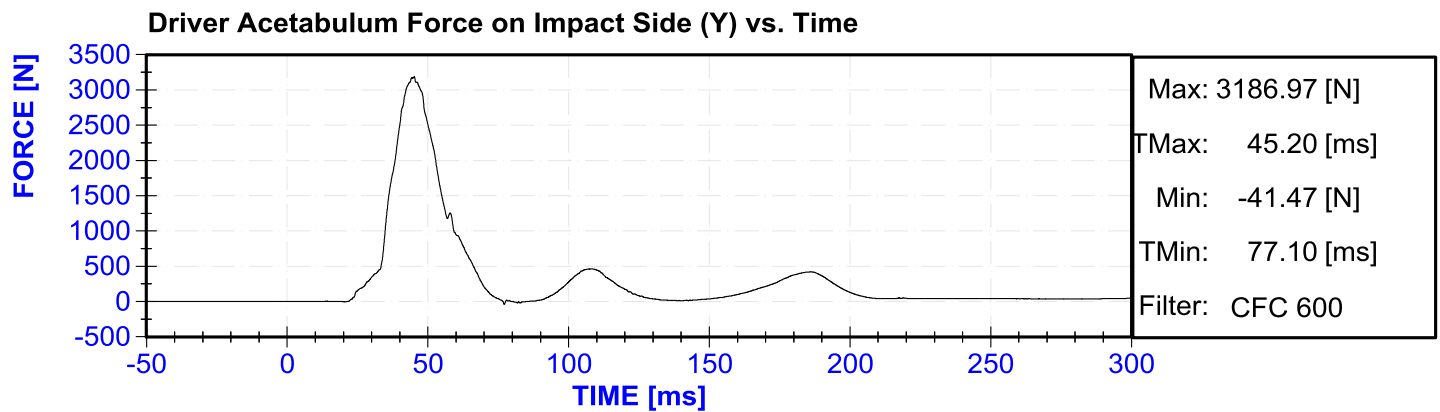
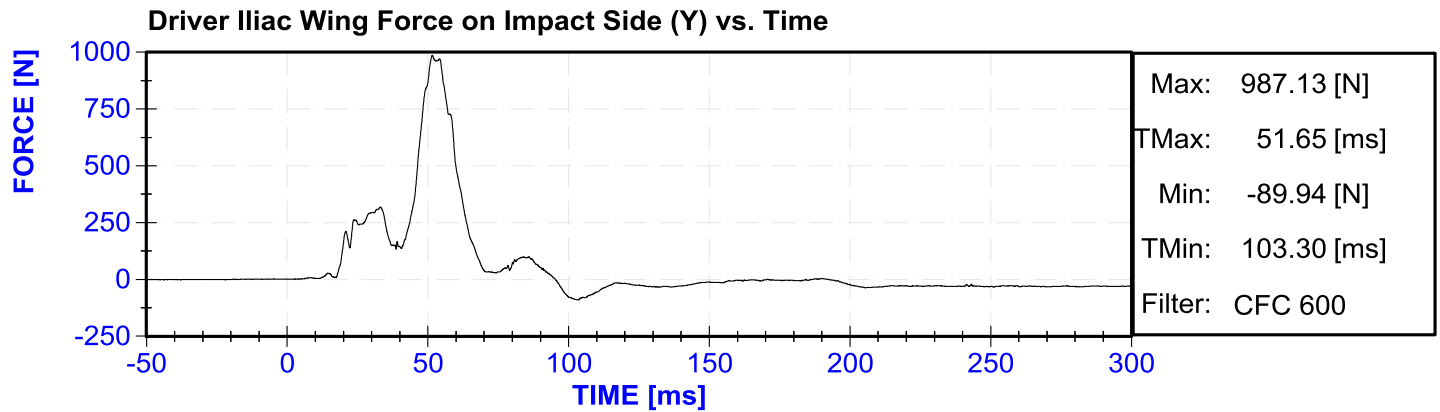
### **Pole Instrumentation Data**

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Load Cell Pole Barrier #2 Force (Y)  
Load Cell Pole Barrier #3 Force (Y)  
Load Cell Pole Barrier #4 Force (Y)  
Load Cell Pole Barrier #5 Force (Y)  
Load Cell Pole Barrier #6 Force (Y)  
Load Cell Pole Barrier #7 Force (Y)  
Load Cell Pole Barrier #8 Force (Y)









**APPENDIX C**

**DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE - DRIVER ATD**

**SERIAL NO: 300**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

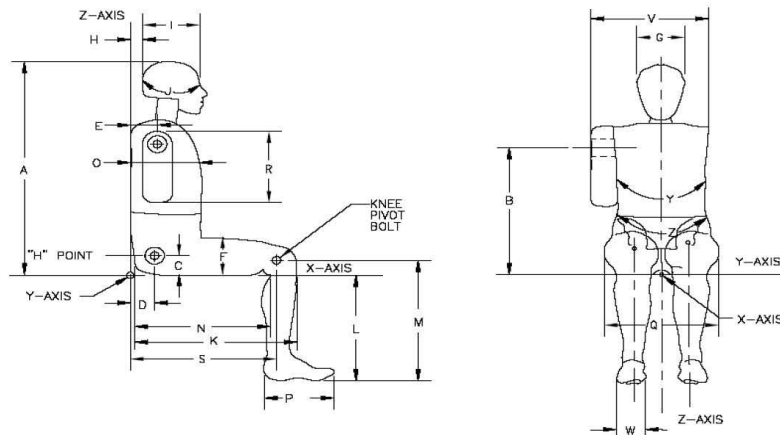


# External Measurements - SID-IIs

Technician: **SPK**

Date: **2/9/2017**

Dummy Serial Number: **300**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	778	Pass
B	Shoulder Pivot Height	437	453	446	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	104	Pass
F	Thigh Clearance	119	135	123	Pass
G	Head Breadth	140	148	141	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	535	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	436	Pass
O	Chest Depth w/o jacket	195	211	207	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	251	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	871	Pass
Z	Waist Circumference	761	791	770	Pass



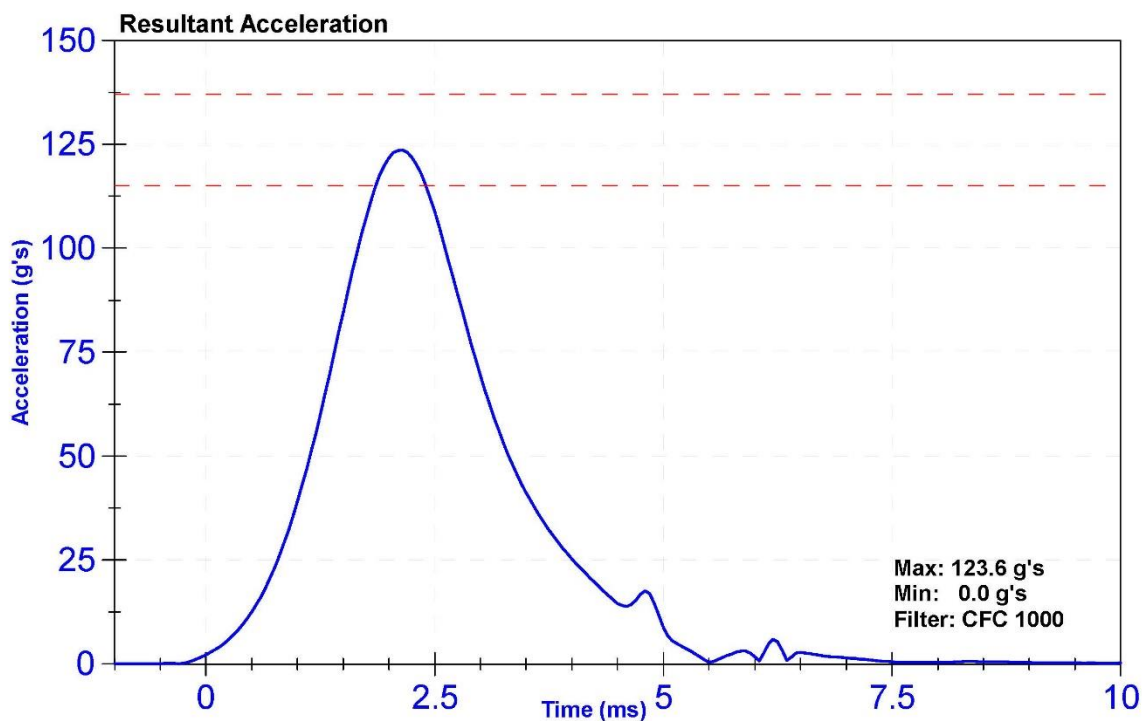
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

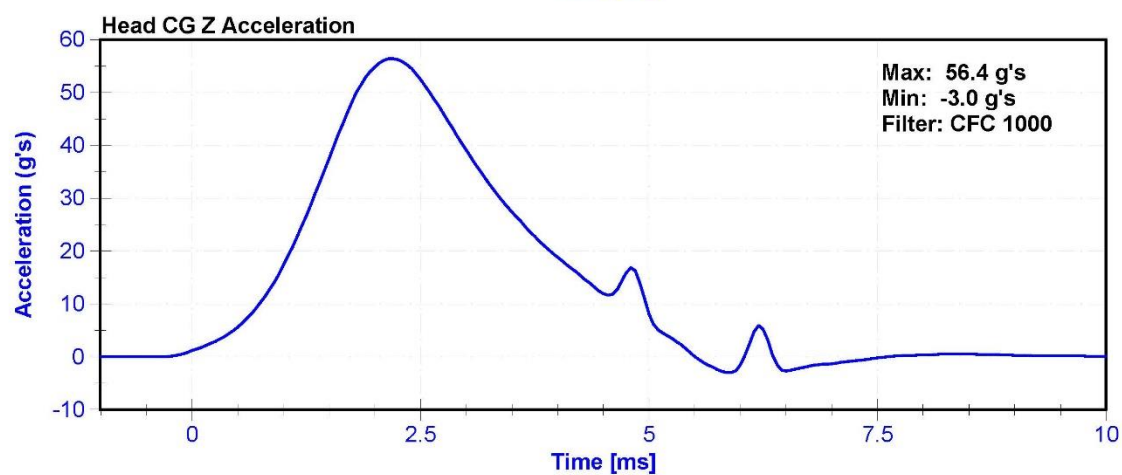
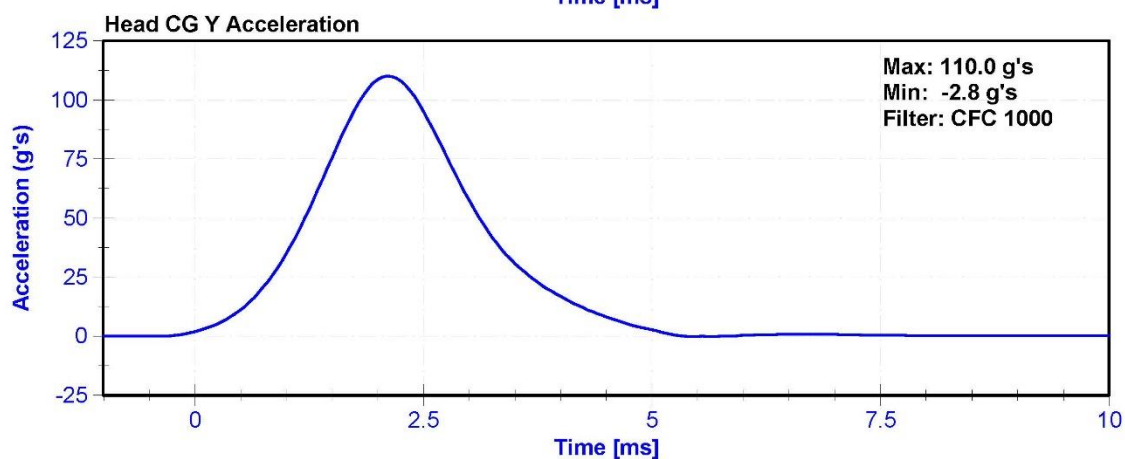
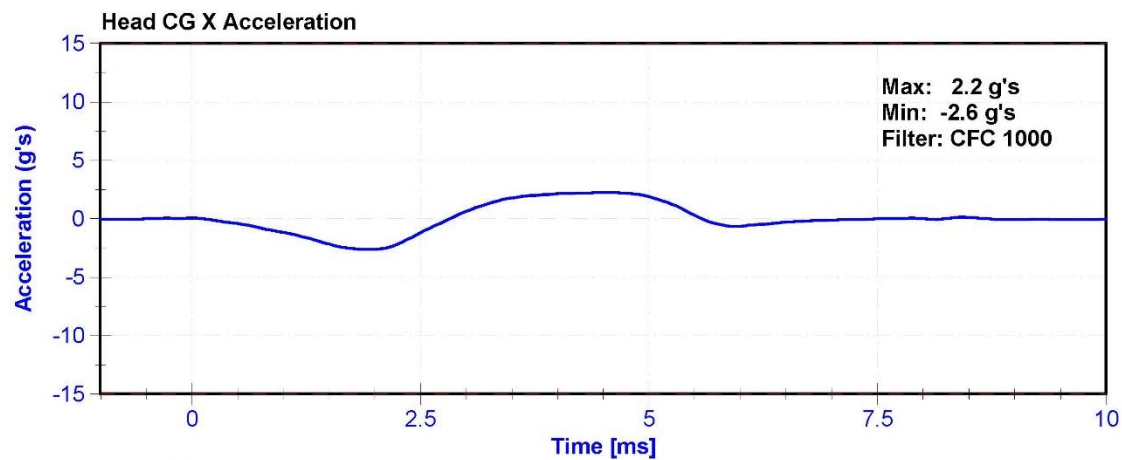
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	34	Pass
Resultant Acceleration	115	137	g's	123.6	Pass
Oscillation	0	15	%	14.	Pass
Fore-Aft Acceleration	-15	15	g's	-2.6	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	12/15/2016	6/15/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	12/15/2016	6/15/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P68608	12/15/2016	6/15/2017





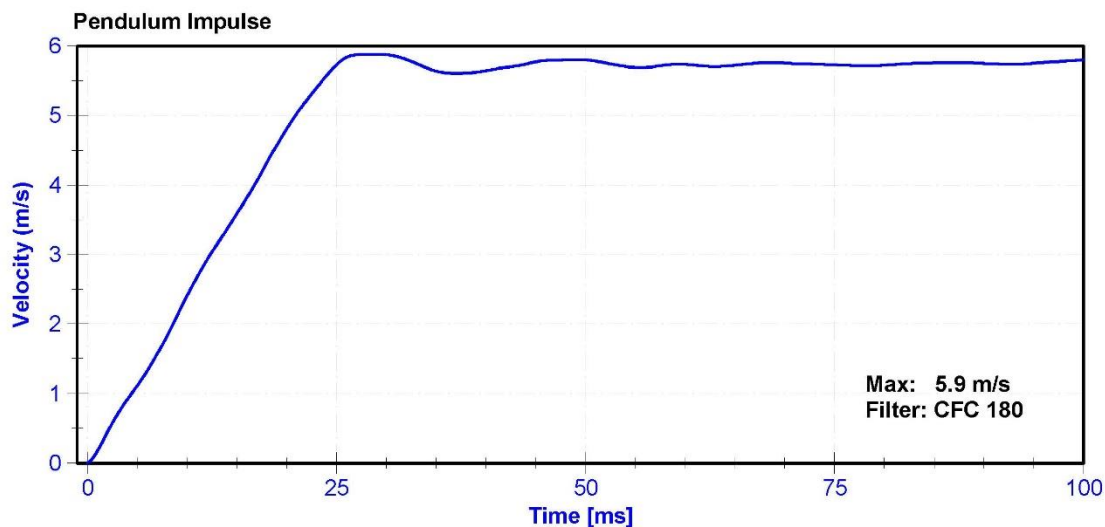
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

#### Results

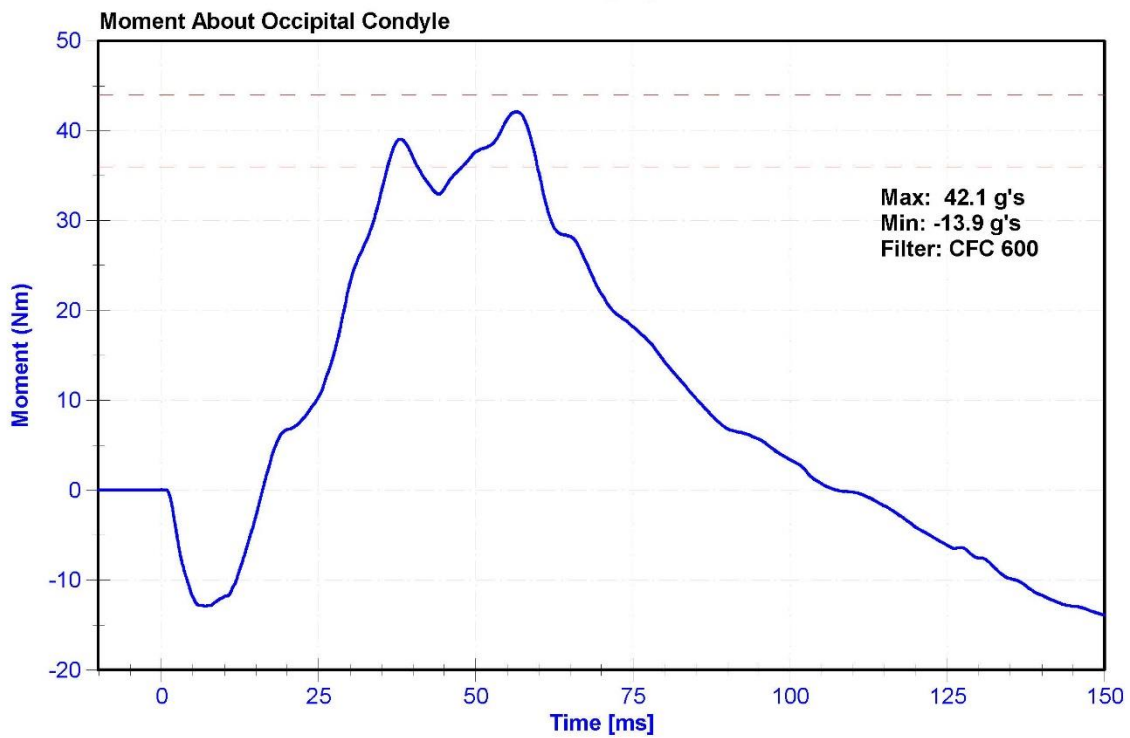
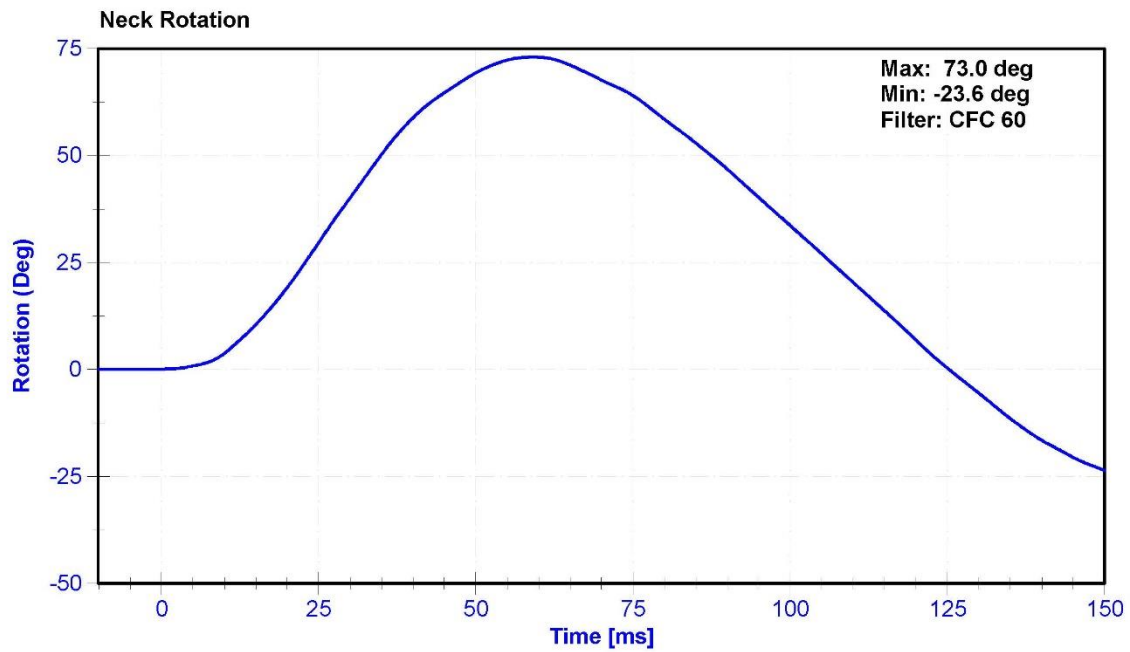
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	25.1	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.41	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.59	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.81	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.73	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.88	Pass
Neck Rotation	71	81	deg	73.0	Pass
Time at Maximum Rotation	50	70	ms	59.2	Pass
Moment about the OC	36	44	Nm	42.1	Pass
Moment Decay to 0 Nm	102	126	ms	107.5	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/12/2016	10/12/2017
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/12/2016	10/12/2017
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017







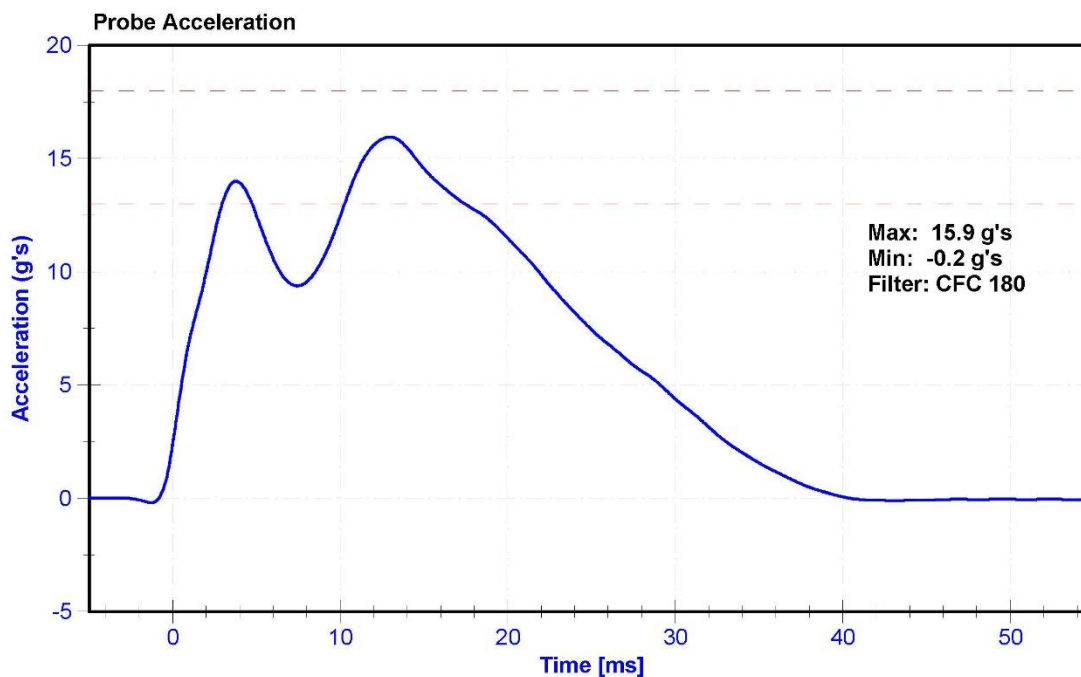
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

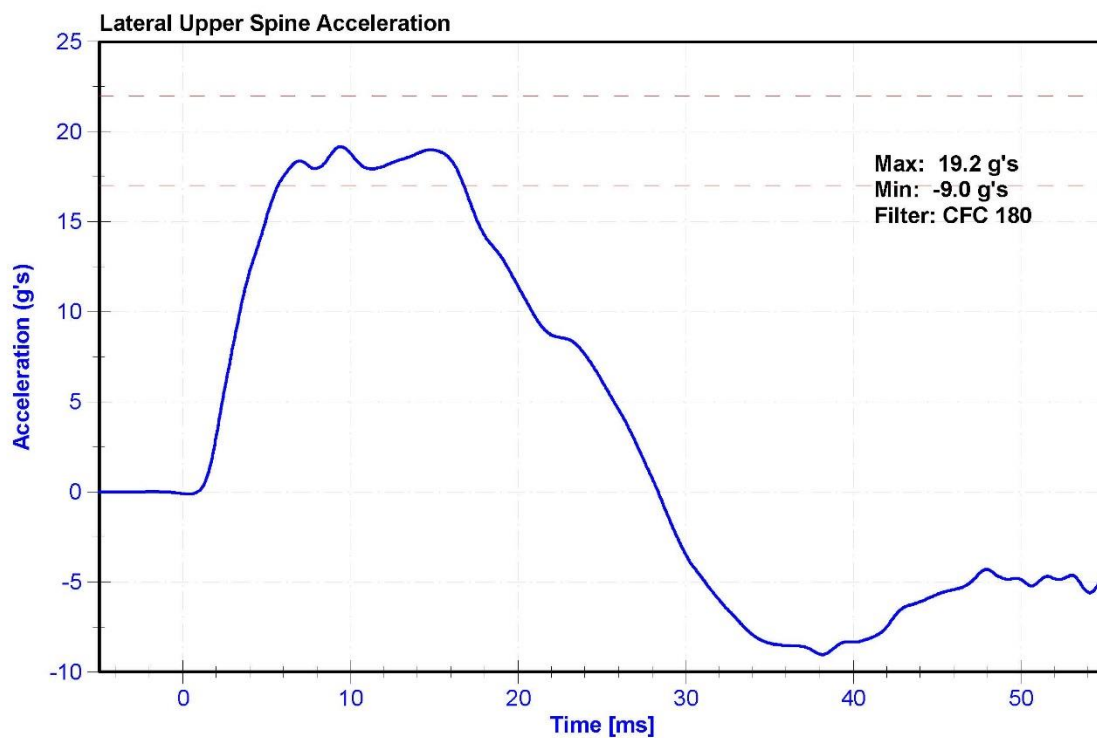
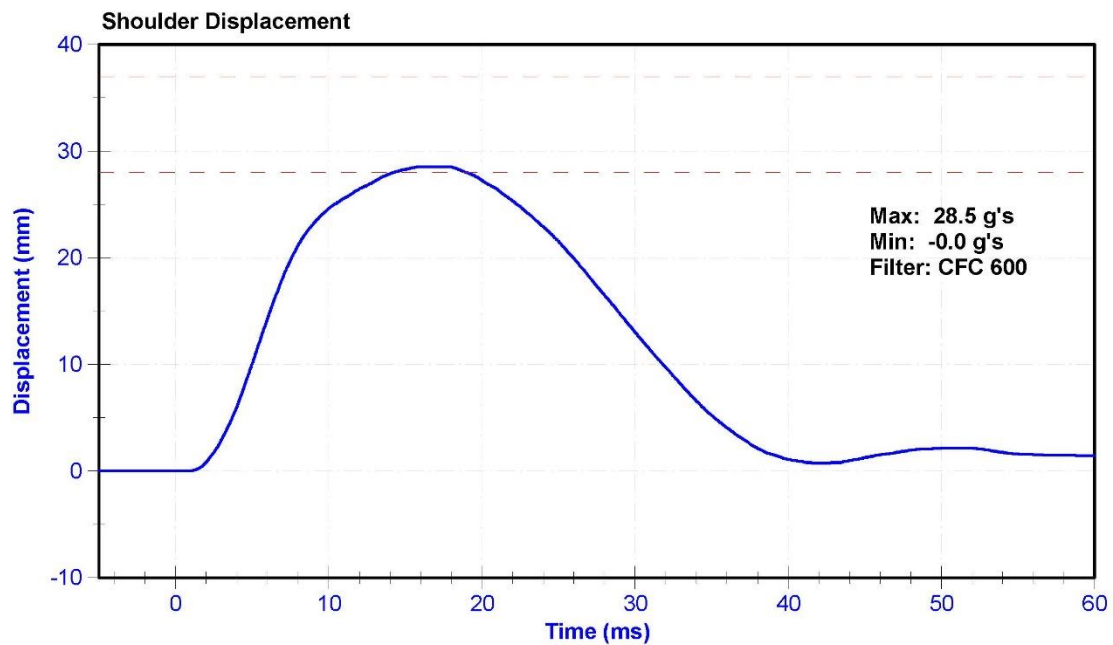
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	35.6	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	13	18	g's	15.9	Pass
Shoulder Deflection	28	37	mm	28.5	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.2	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	6/16/2016	6/16/2017
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	12/15/2016	6/15/2017







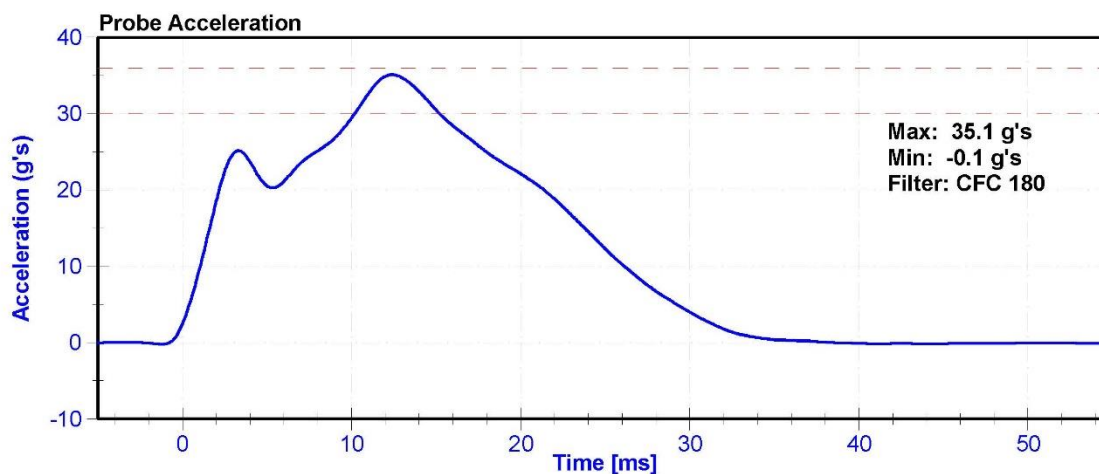
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

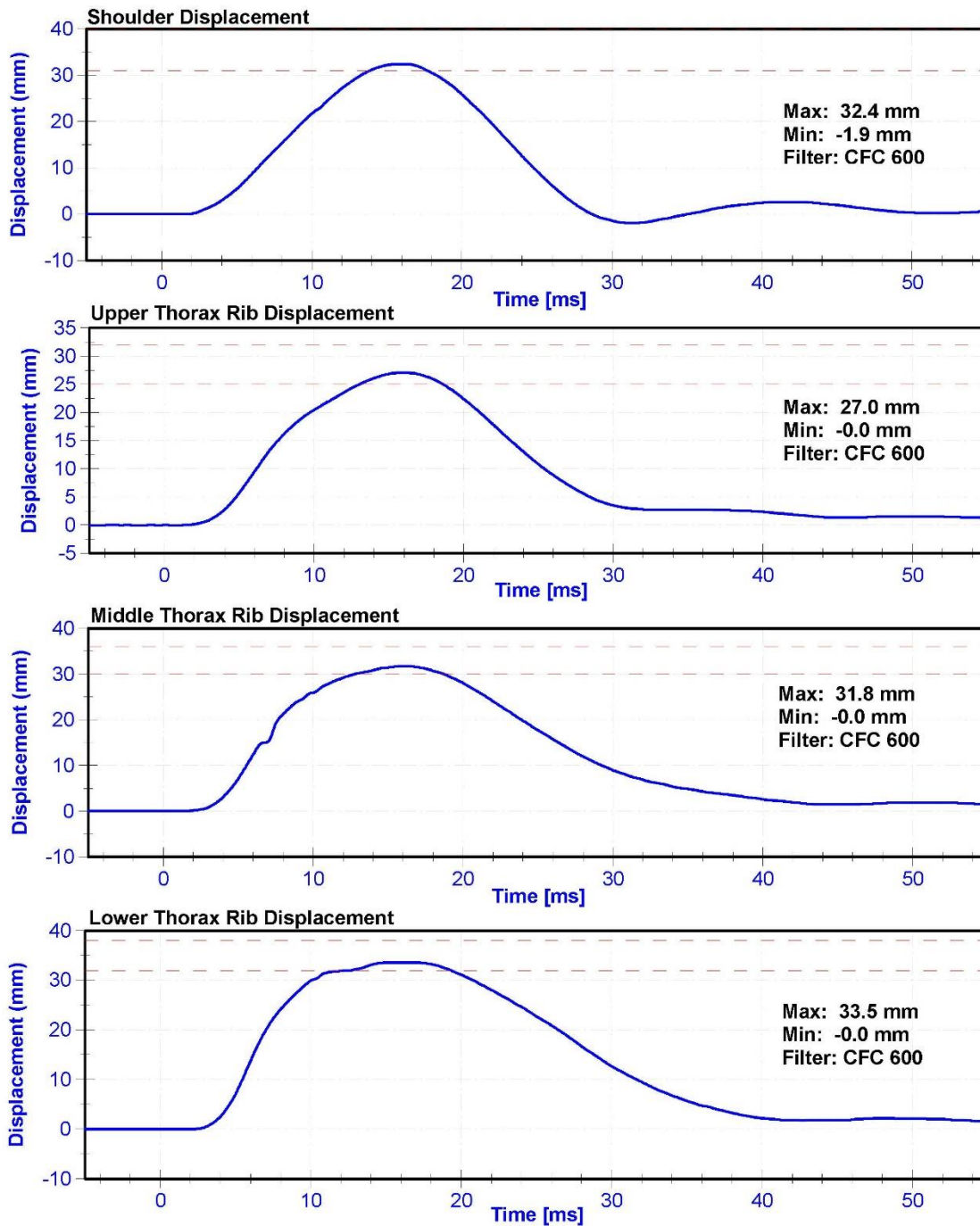
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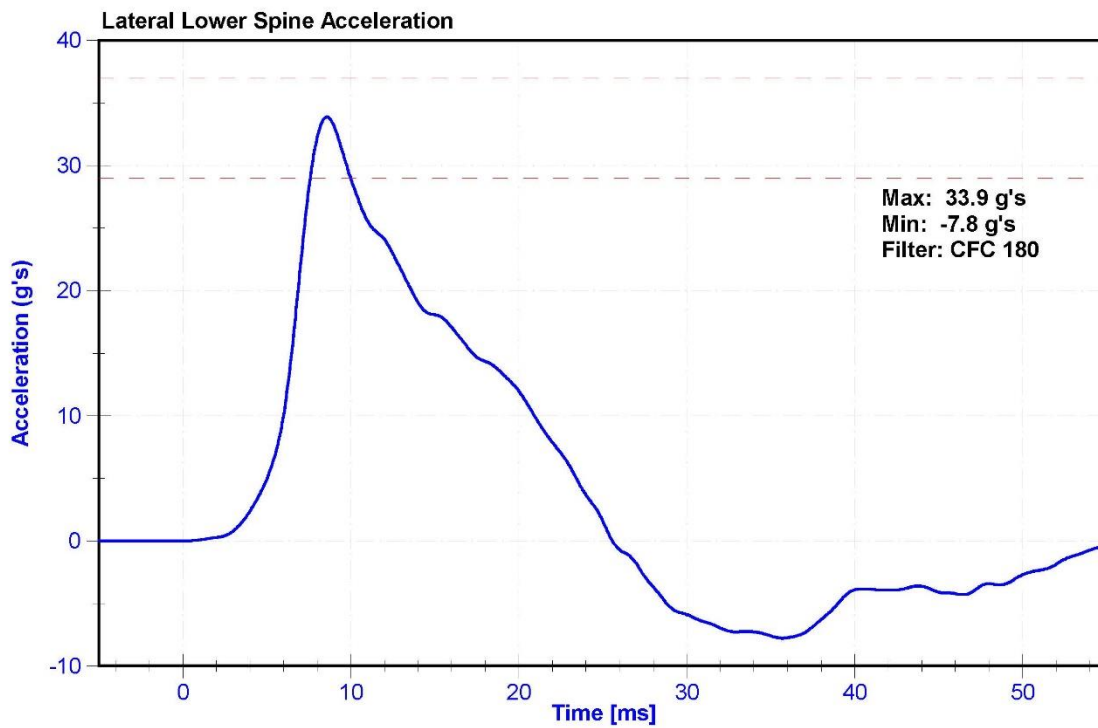
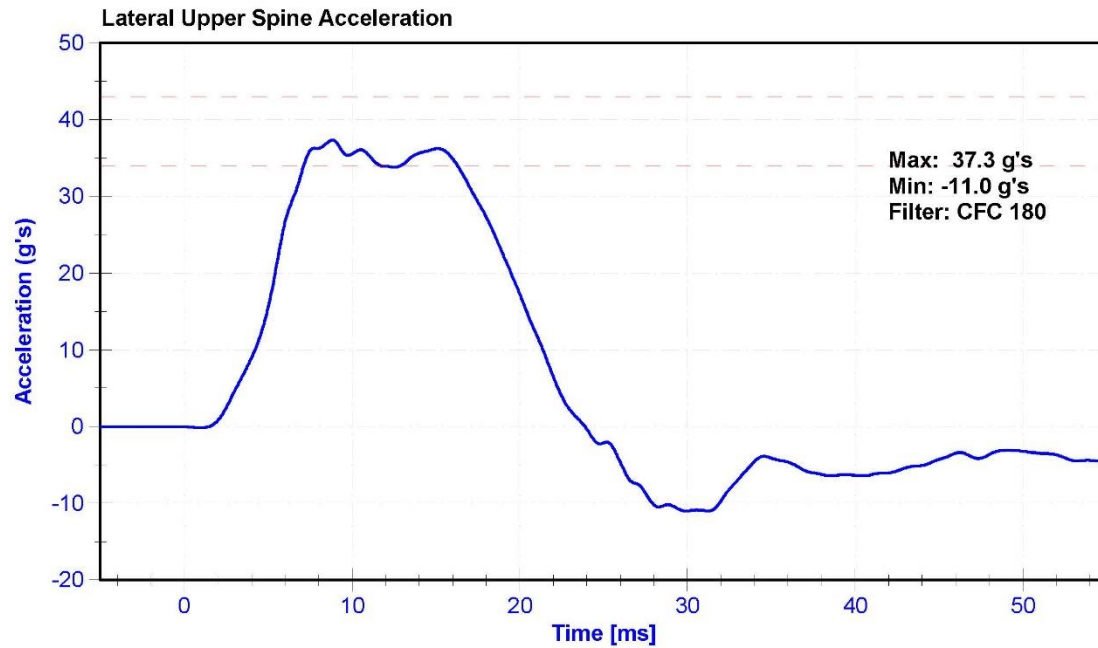
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	33.3	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration after 5 ms	30	36	g's	35.1	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.3	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.9	Pass
Shoulder Deflection	31	40	mm	32.4	Pass
Upper Thorax Rib Deflection	25	32	mm	27.0	Pass
Mid Thorax Rib Deflection	30	36	mm	31.8	Pass
Lower Thorax Rib Deflection	32	38	mm	33.5	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P51915	12/15/2016	6/15/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	12/15/2016	6/15/2017
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	6/16/2016	6/16/2017
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	6/16/2016	6/16/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	6/16/2016	6/16/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	6/16/2016	6/16/2017









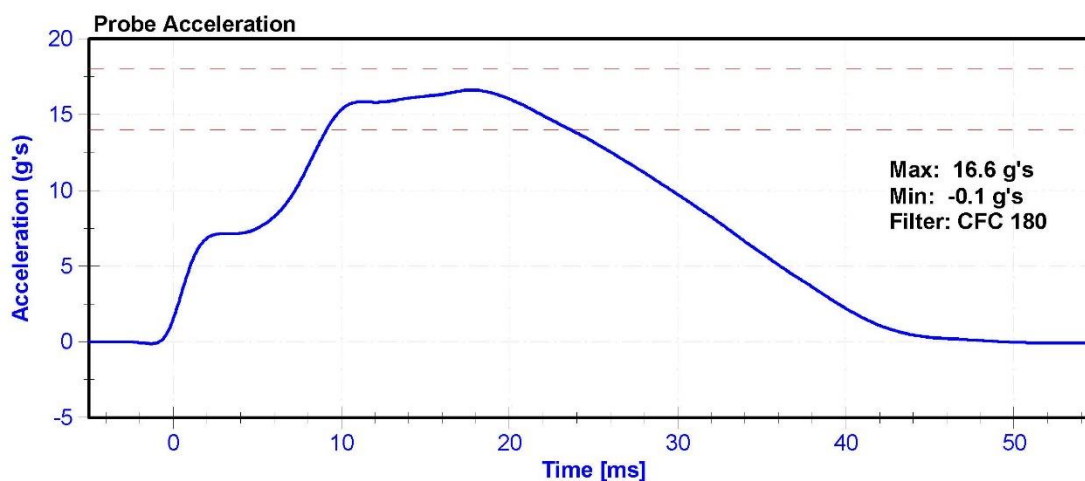
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

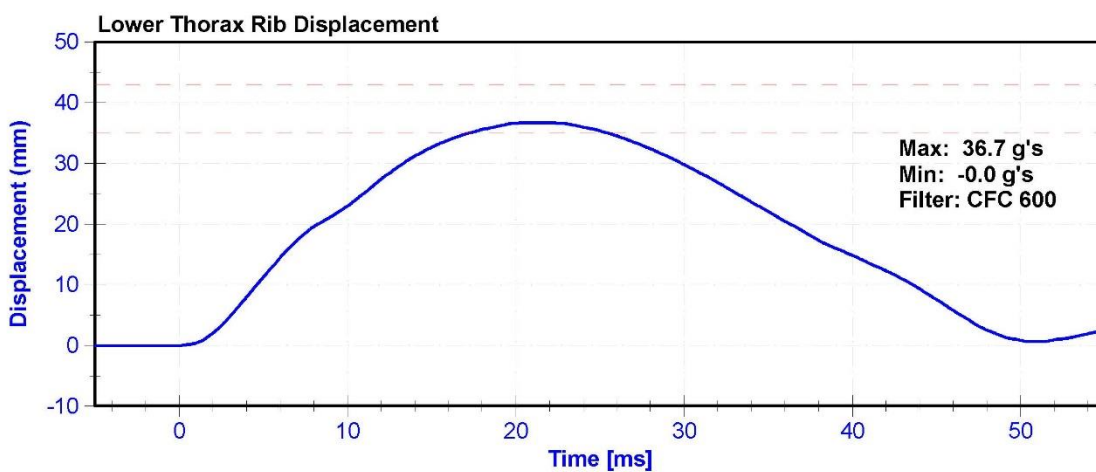
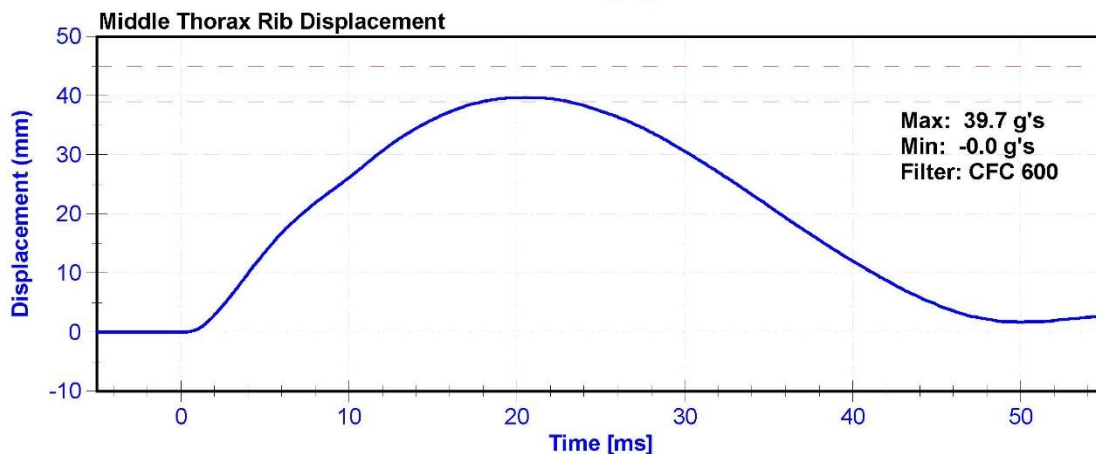
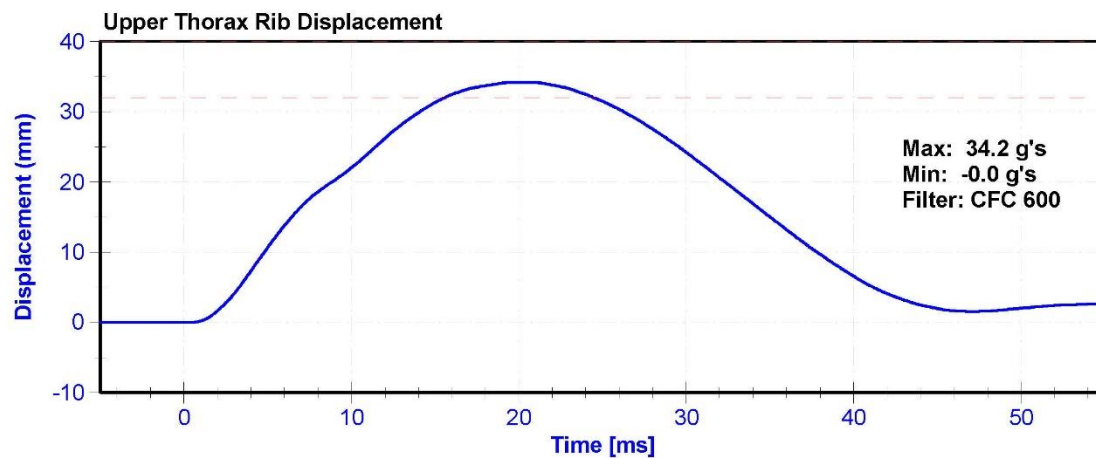
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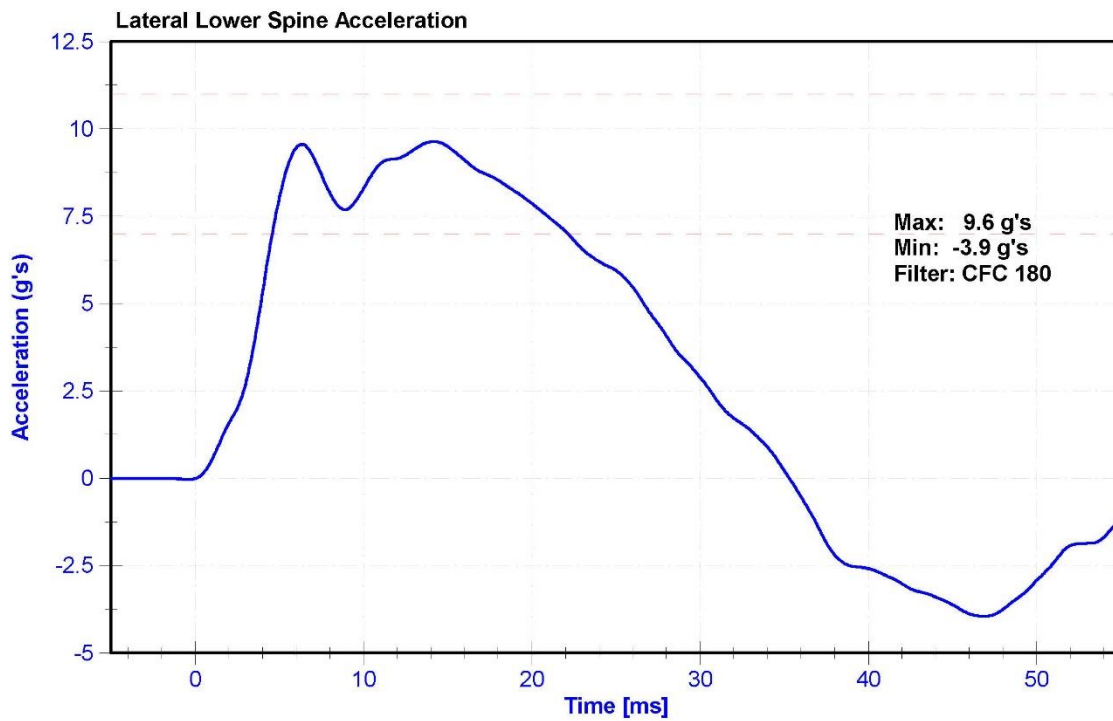
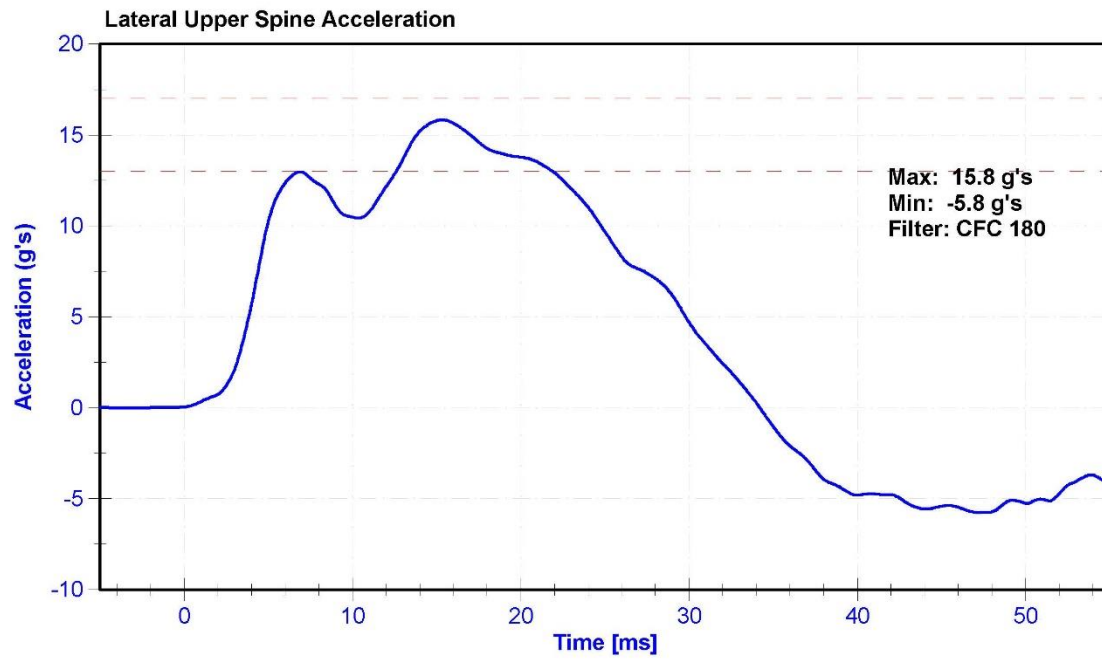
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	32.6	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	14	18	g's	16.6	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.8	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.6	Pass
Upper Thorax Rib Deflection	32	40	mm	34.2	Pass
Middle Thorax Rib Deflection	39	45	mm	39.7	Pass
Lower Thorax Rib Deflection	35	43	mm	36.7	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	12/15/2016	6/15/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	12/15/2016	6/15/2017
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	6/16/2016	6/16/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	6/16/2016	6/16/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	6/16/2016	6/16/2017









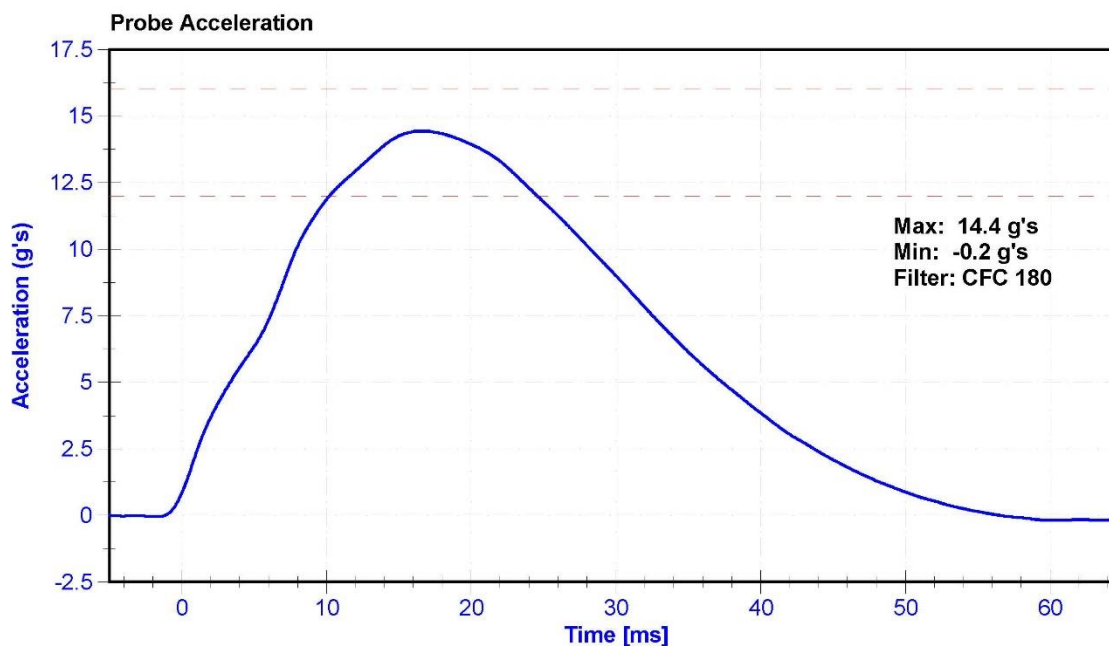
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

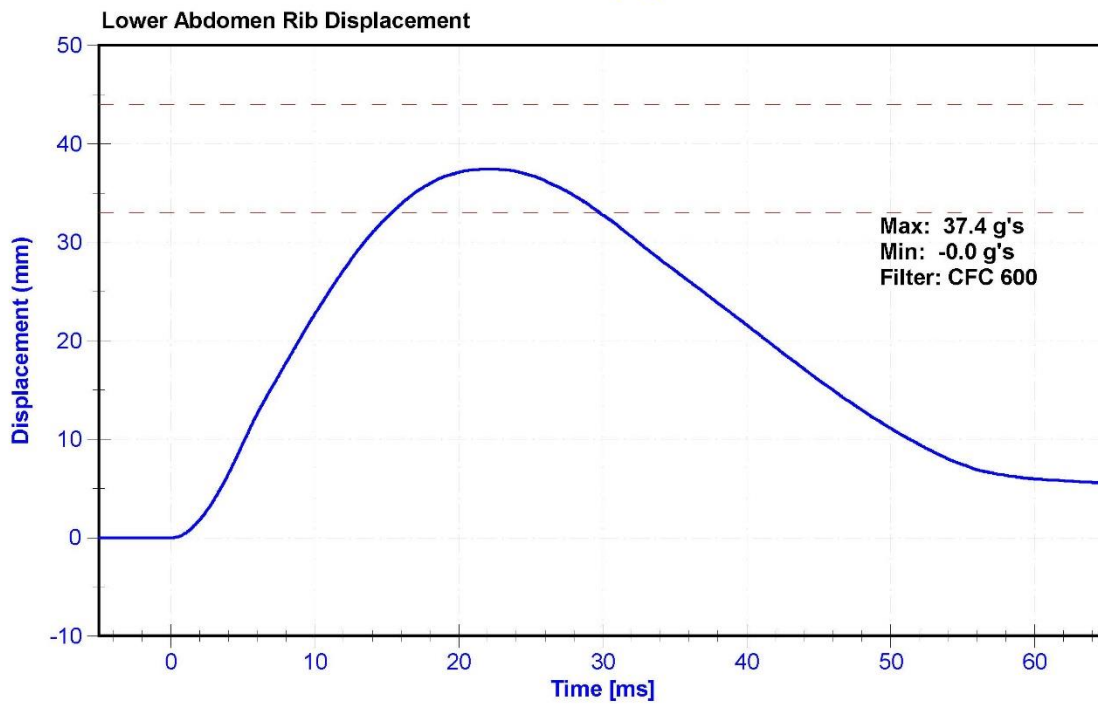
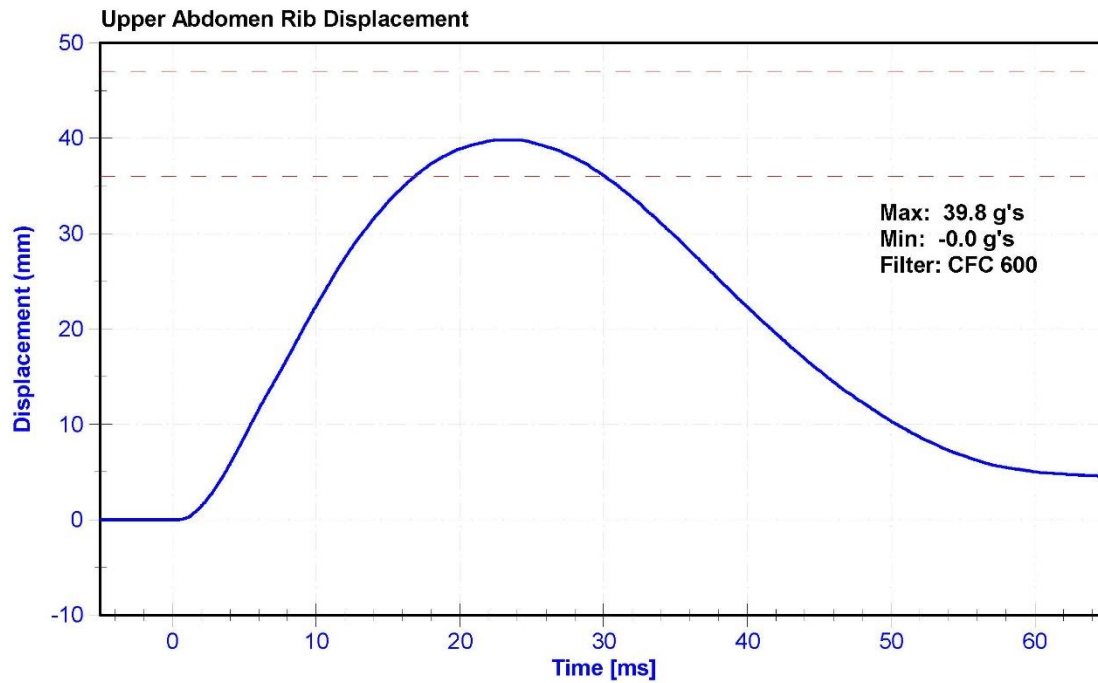
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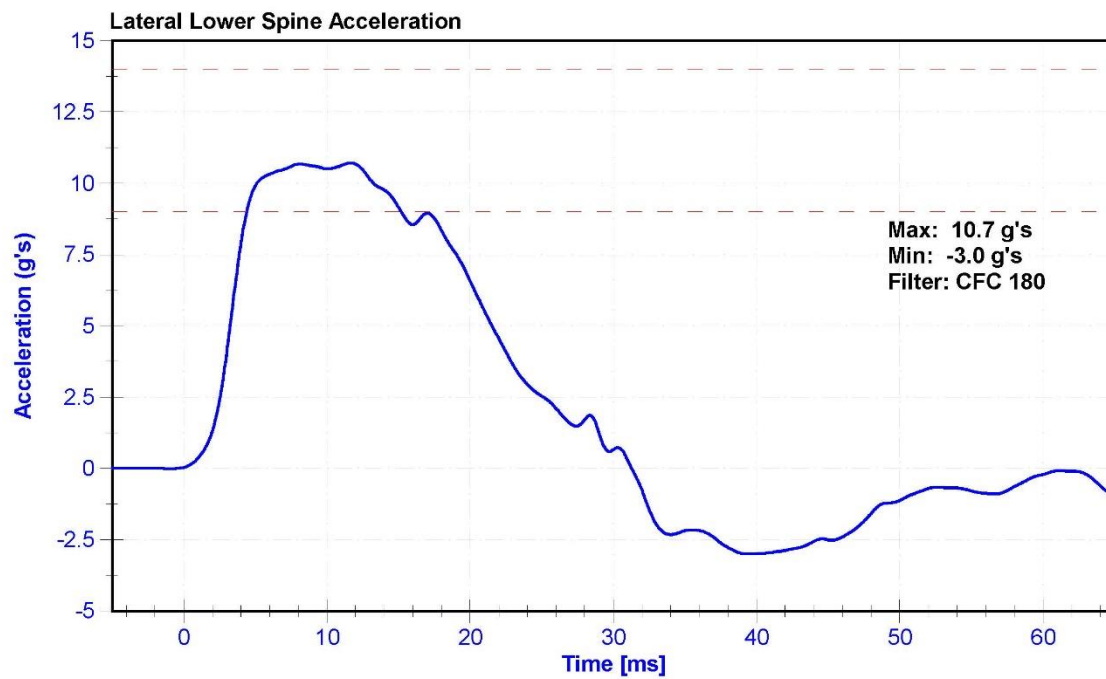
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	33.2	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	14.4	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.7	Pass
Upper Abdomen Rib Deflection	36	47	mm	39.8	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.4	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	12/15/2016	6/15/2017
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	6/16/2016	6/16/2017
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	6/16/2016	6/16/2017









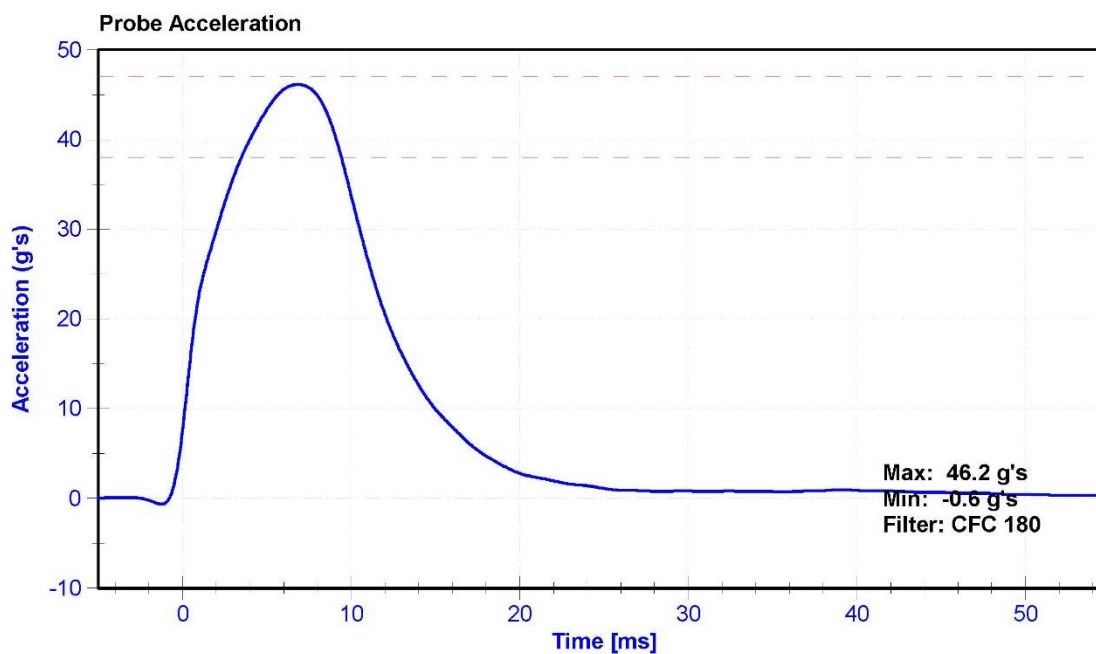
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

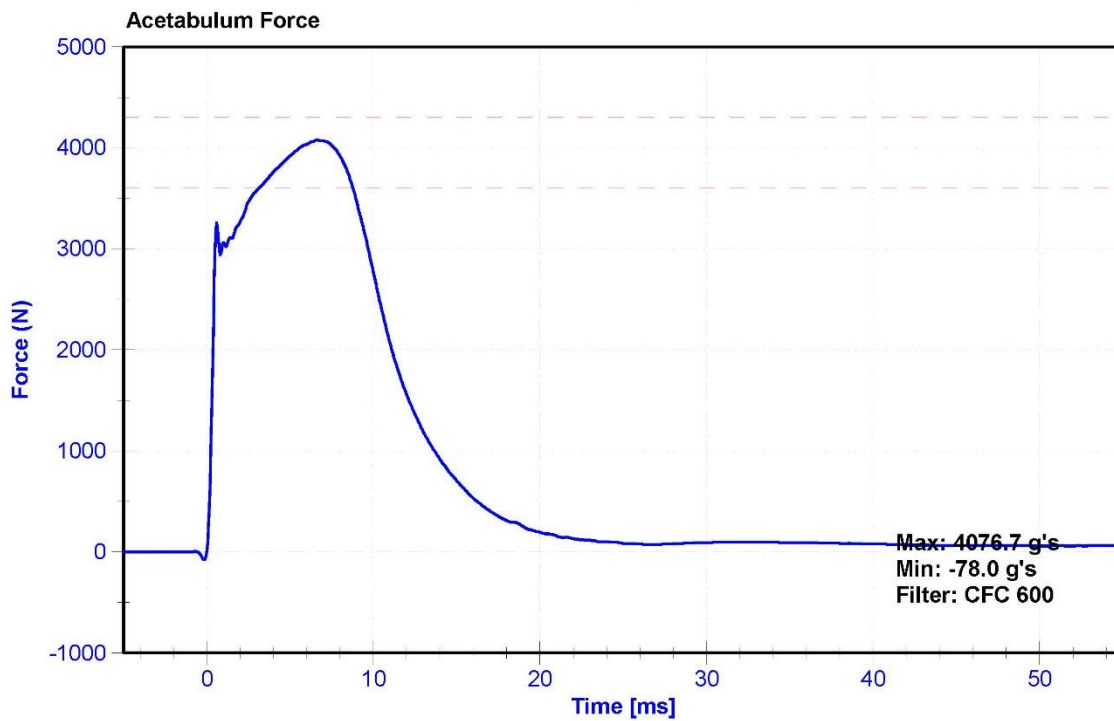
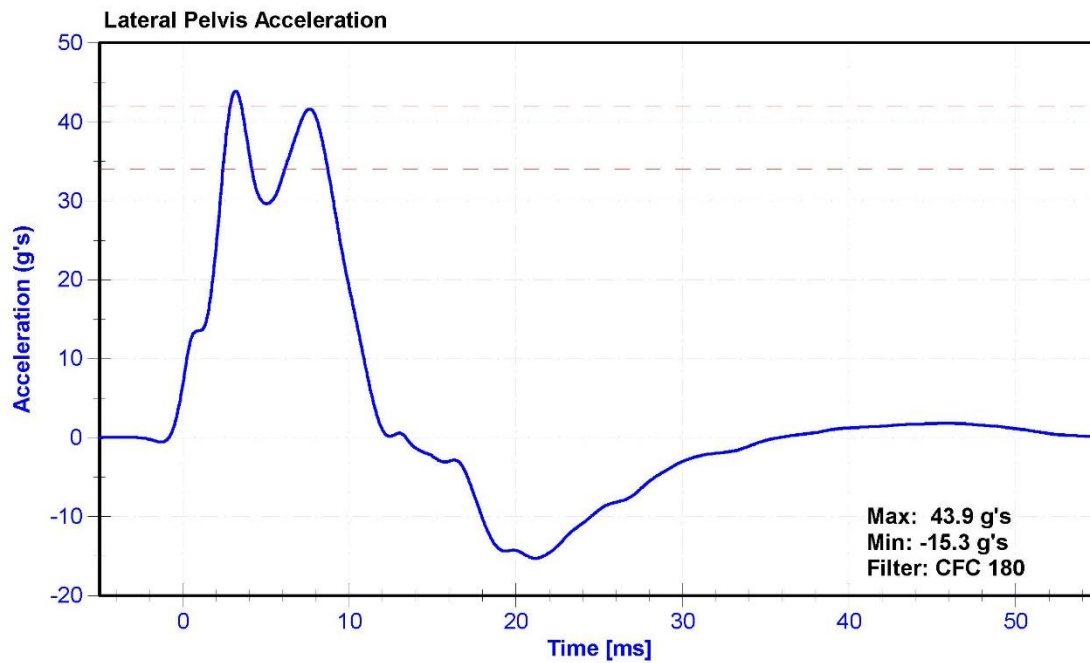
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	35.2	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	46.2	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.6	Pass
Acetabulum Force	3600	4300	N	4076.7	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	12/15/2016	6/15/2017
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	11014	4/6/16	N/A
Crash Test Plug	Humanetics	11035	4/8/16	N/A







# SID-Its Pelvis Plug Certification Test

Plug S/N 11035

Test Number 2178

Report Number 2172

Test Date 4/8/2016 9:31:14 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

Testing Machine STM-20 5965542

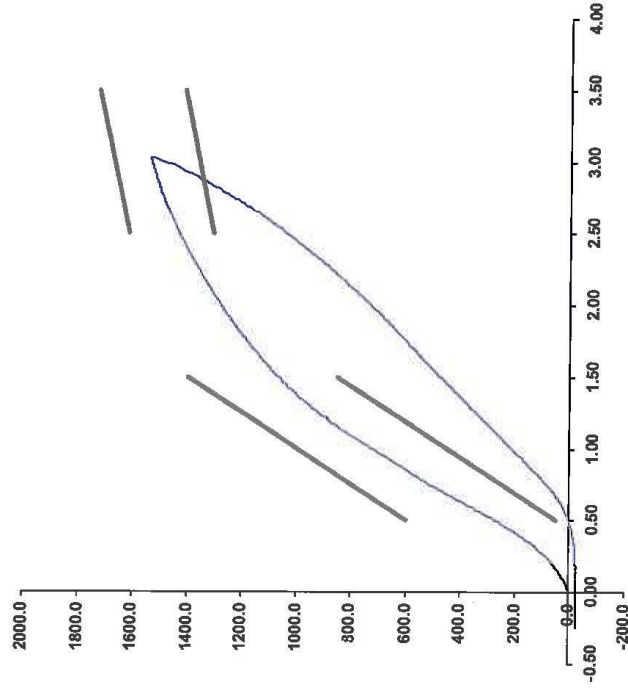
Load Cell S/N (T1240813), Units (LBS ) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Force (-N) vs Extension (-mm)



Operator	DC
Part Number	180-4450

Template No 107	08-Apr-16
SACO Research	

By : DC Date : 4/8/16  
 SACO Research 41735 Elm St, #401 Murietta, CA 92562 Tel 310-694-2082 FAX  
300 CRASH  
2/5/17





# SID-Its Pelvis Plug Certification Test

Plug S/N 11014

Test Number 2085

Report Number 2079

Test Date 4/6/2016 9:19:59 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,308.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

Testing Machine STM-20 5965542

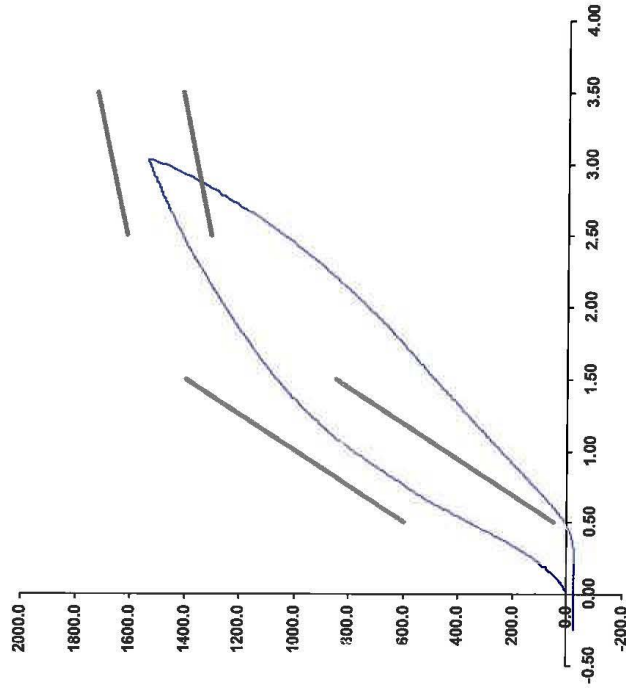
Load Cell S/N (T1240813), Units (LBS) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Force (-N) vs Extension (-mm)



Operator	DC
Part Number	180-4450

Template No 107  
SACO Research

08-Apr-16

By : DC Date : 4/6/16

SACO Research 41735 Elm St, #401 Murietta, CA 92562 Tel 310-694-2082 FAX

300 CERTIFICATION  
2/8/17

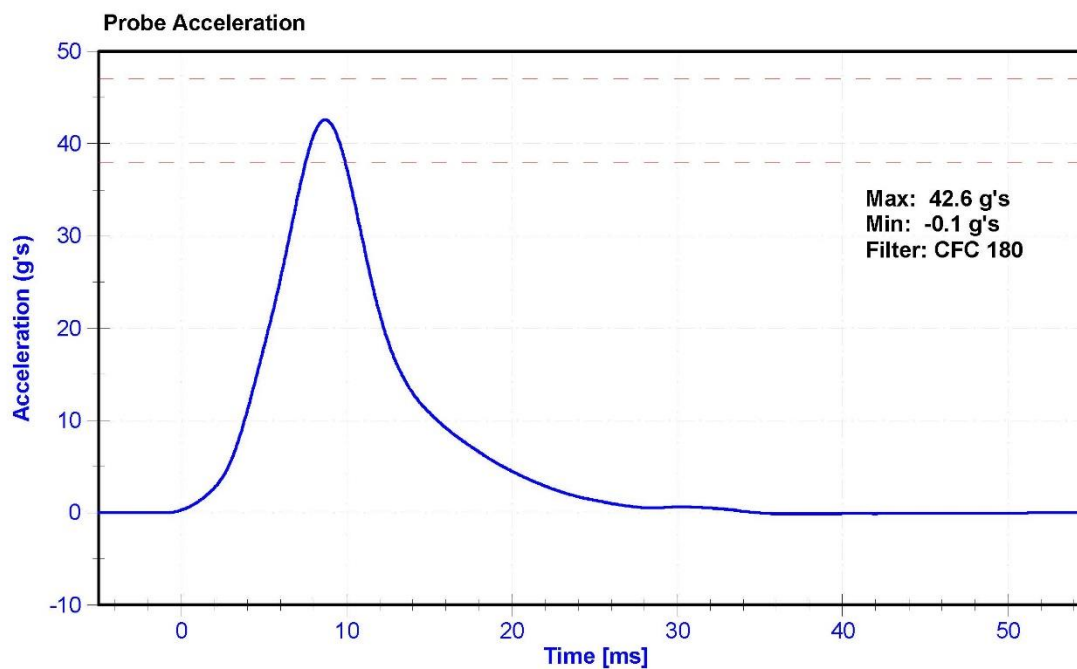
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

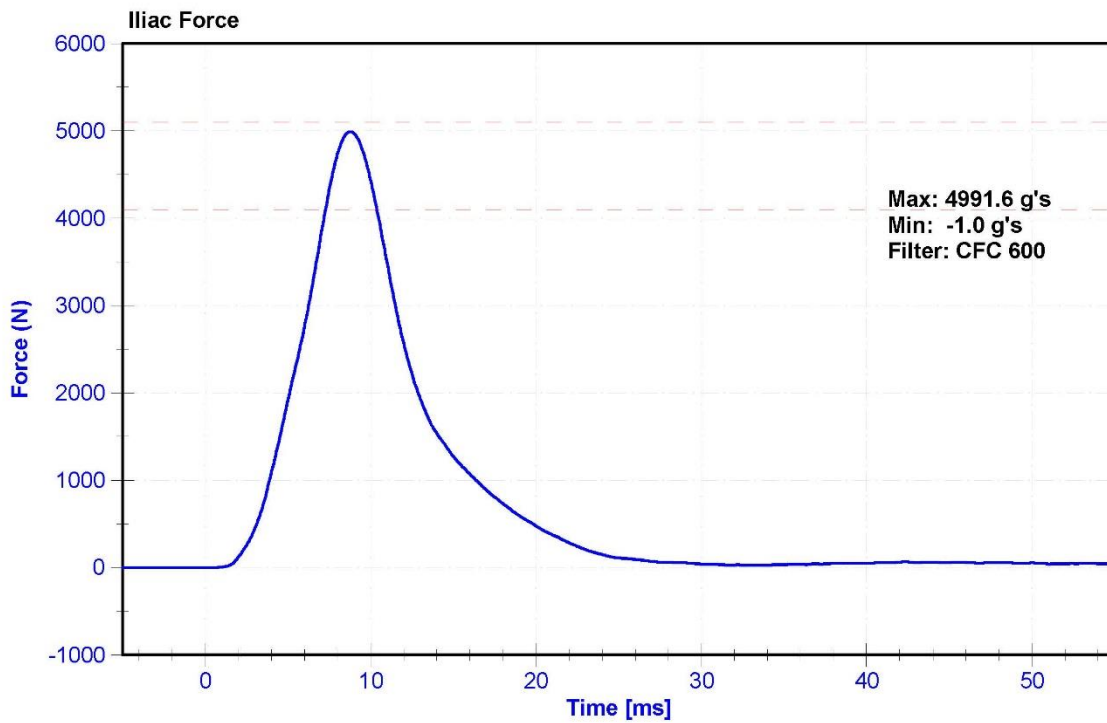
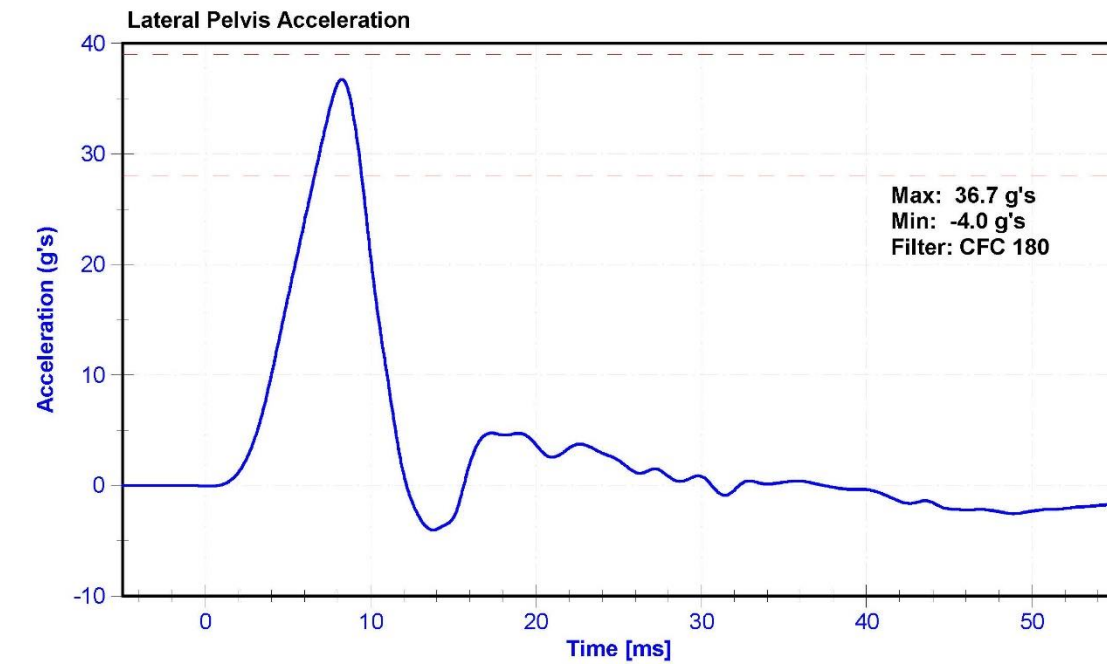
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	33.2	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	42.6	Pass
Lateral Pelvis Acceleration	28	39	g's	36.7	Pass
Iliac Force	4100	5100	N	4991.6	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	12/15/2016	6/15/2017
Iliac Load Cell	DENTON 3228J	LC-279Fy	5/24/2016	5/24/2017







**CALIBRATION TEST RESULTS**

**POST-TEST**

**SID-IIS 5<sup>TH</sup> PERCENTILE FEMALE - DRIVER ATD**

**SERIAL NO: 300**

**(CONFIGURED FOR LEFT SIDE IMPACT)**

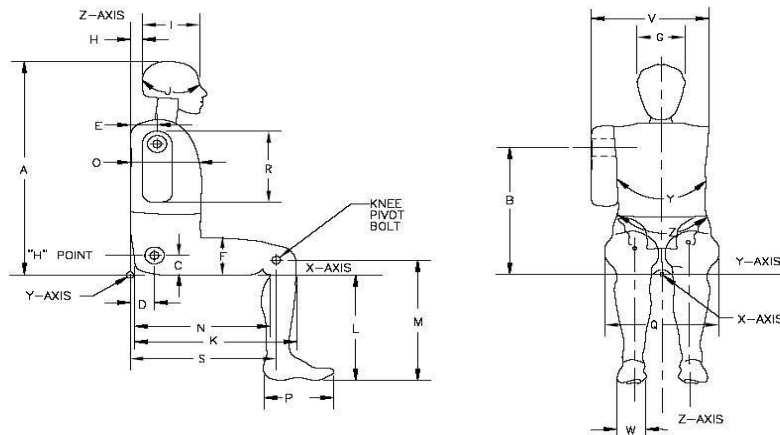


# External Measurements - SID-IIs

Technician: **SPK**

Date: **3/1/2017**

Dummy Serial Number: **300**



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	778	Pass
B	Shoulder Pivot Height	437	453	447	Pass
C	H-point Height	79	89	87	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	105	Pass
F	Thigh Clearance	119	135	123	Pass
G	Head Breadth	140	148	142	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	534	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	436	Pass
O	Chest Depth w/o jacket	195	211	206	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	251	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	871	Pass
Z	Waist Circumference	761	791	770	Pass

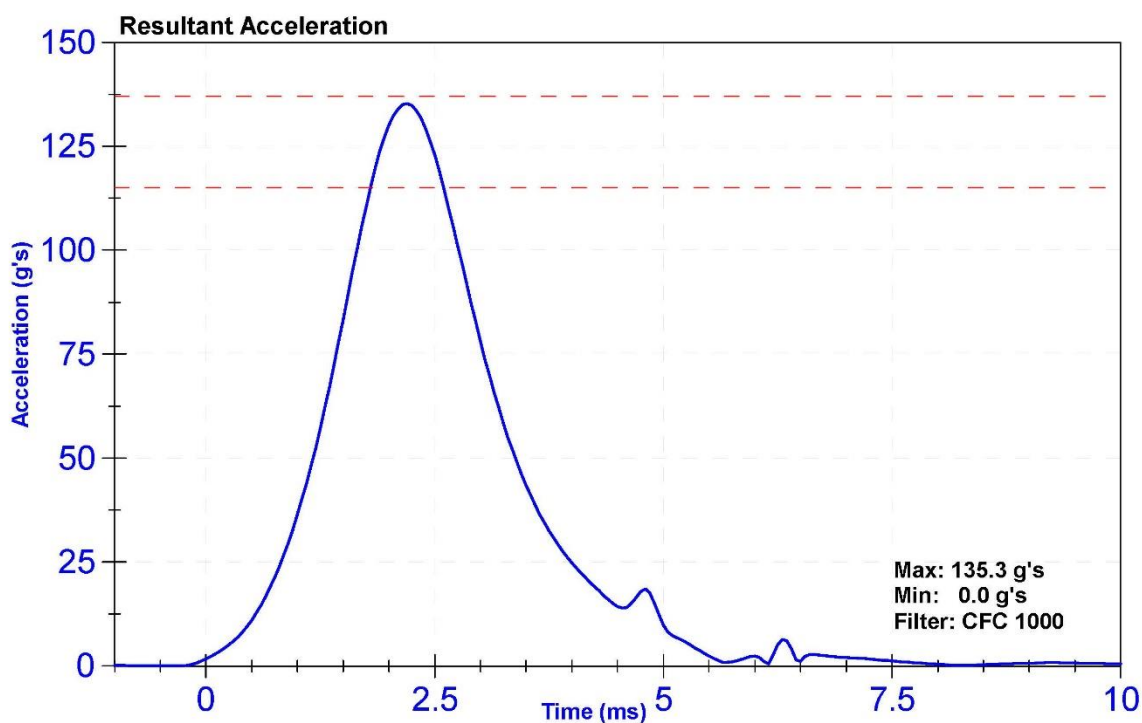
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

### Results

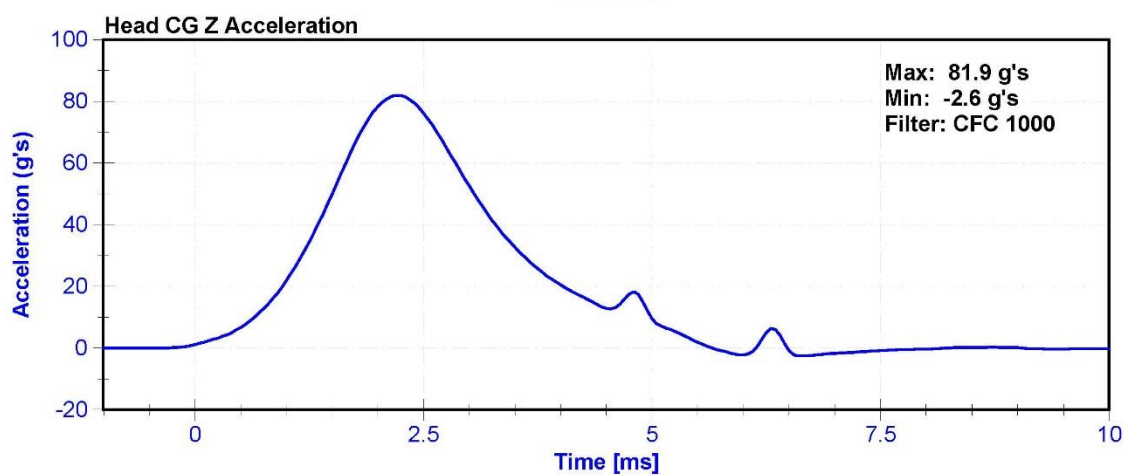
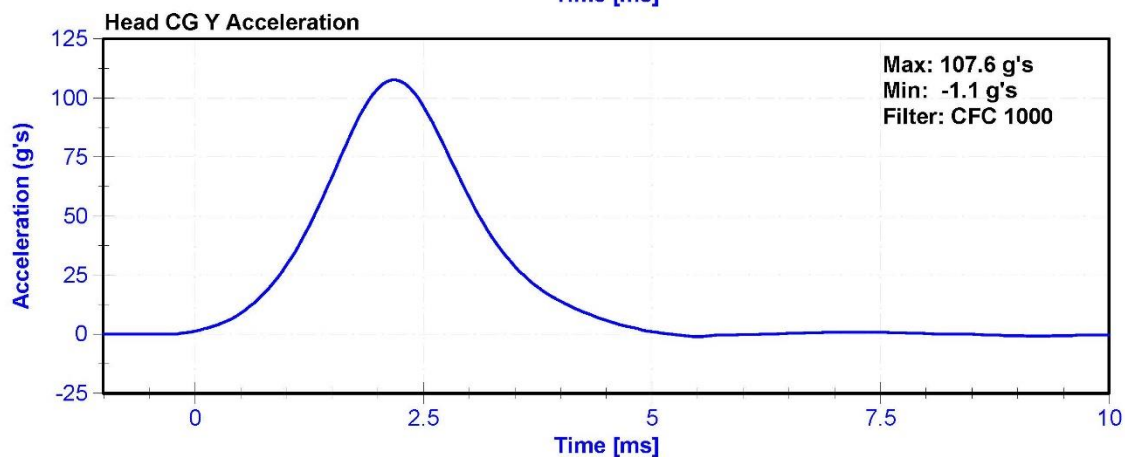
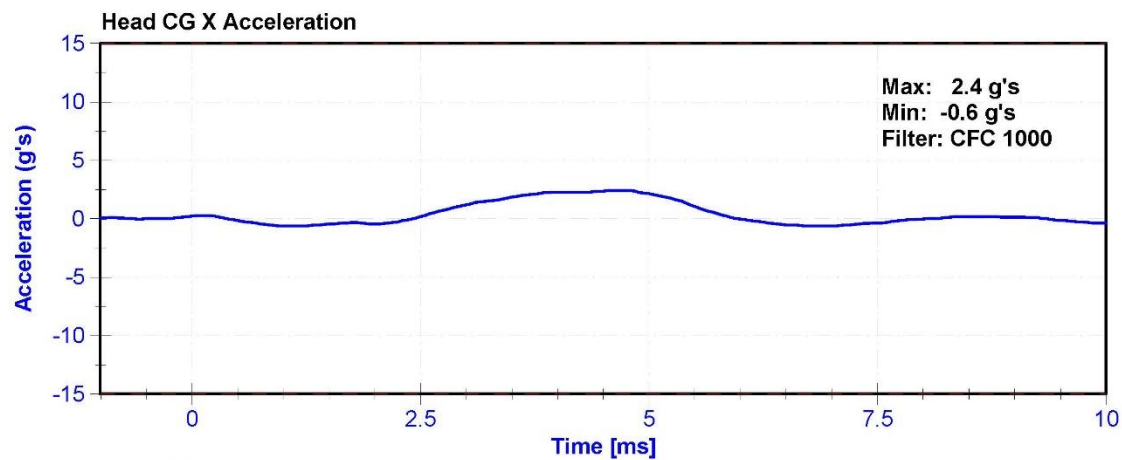
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	28.8	Pass
Resultant Acceleration	115	137	g's	135.3	Pass
Oscillation	0	15	%	13.	Pass
Fore-Aft Acceleration	-15	15	g's	2.4	Pass

### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	12/15/2016	6/15/2017
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	12/15/2016	6/15/2017
Z Accelerometer	ENDEVCO 7264CT	AC-P68608	12/15/2016	6/15/2017







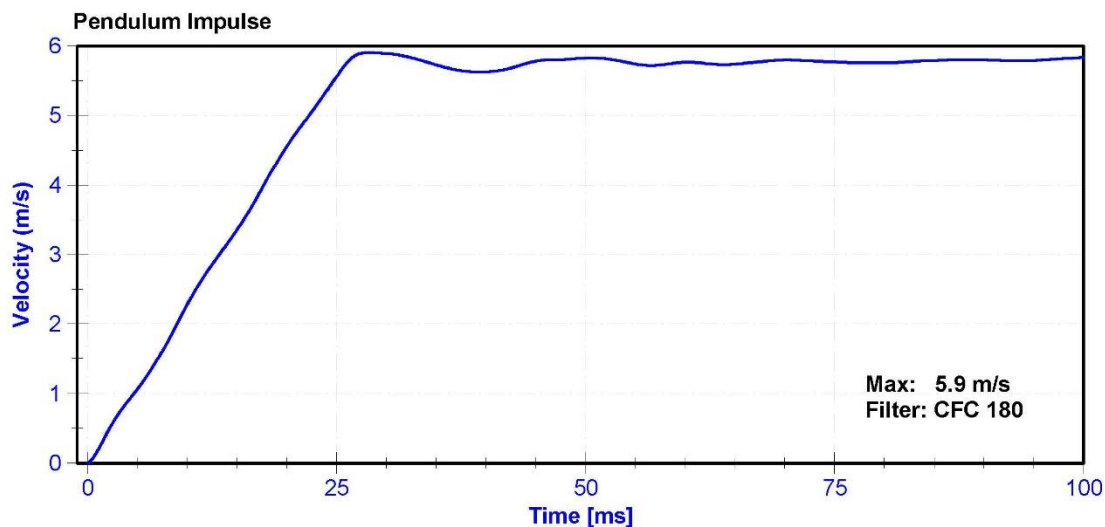
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

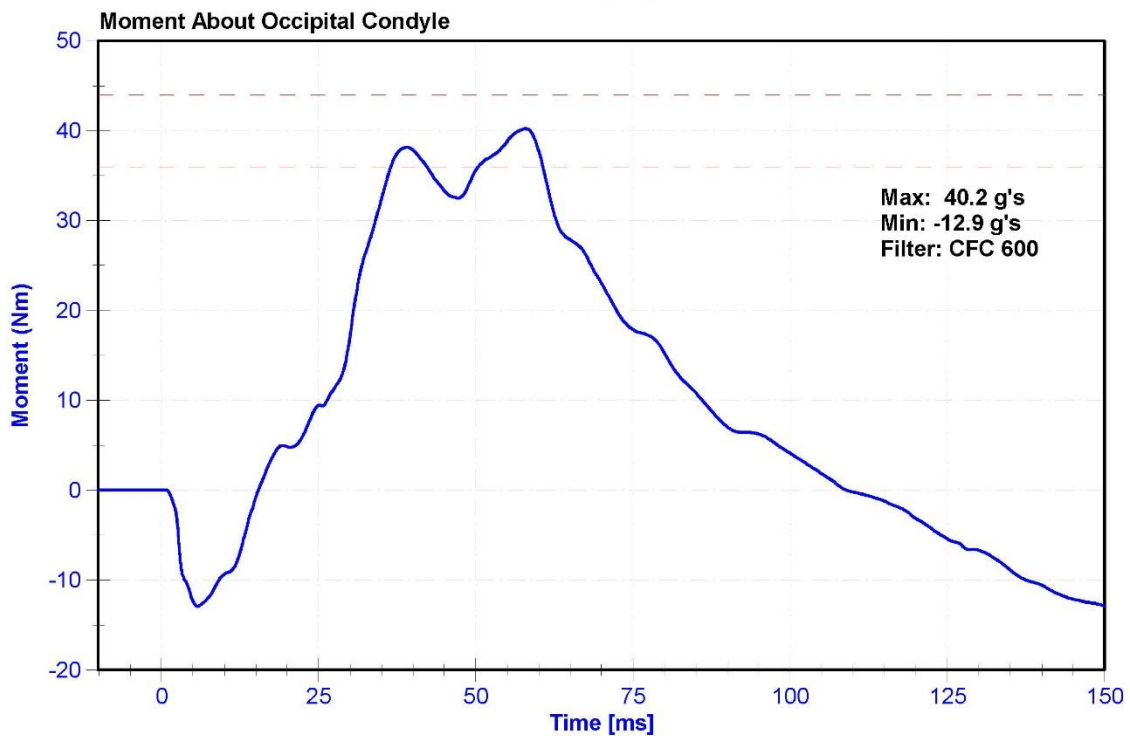
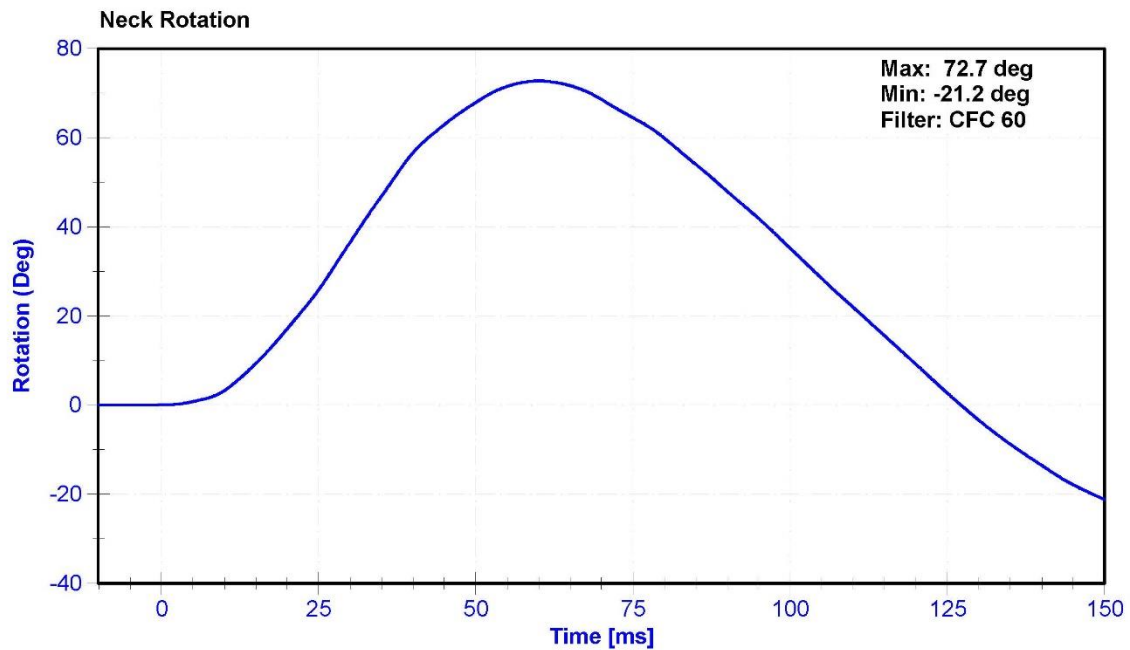
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	27.5	Pass
Velocity	5.51	5.63	m/s	5.620	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.28	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.35	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.55	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.56	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.91	Pass
Neck Rotation	71	81	deg	72.7	Pass
Time at Maximum Rotation	50	70	ms	60.0	Pass
Moment about the OC	36	44	Nm	40.2	Pass
Moment Decay to 0 Nm	102	126	ms	109.0	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/12/2016	10/12/2017
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/12/2016	10/12/2017
Upper Neck Load Cell	Denton 1716A	LC-440Fy	5/24/2016	5/24/2017







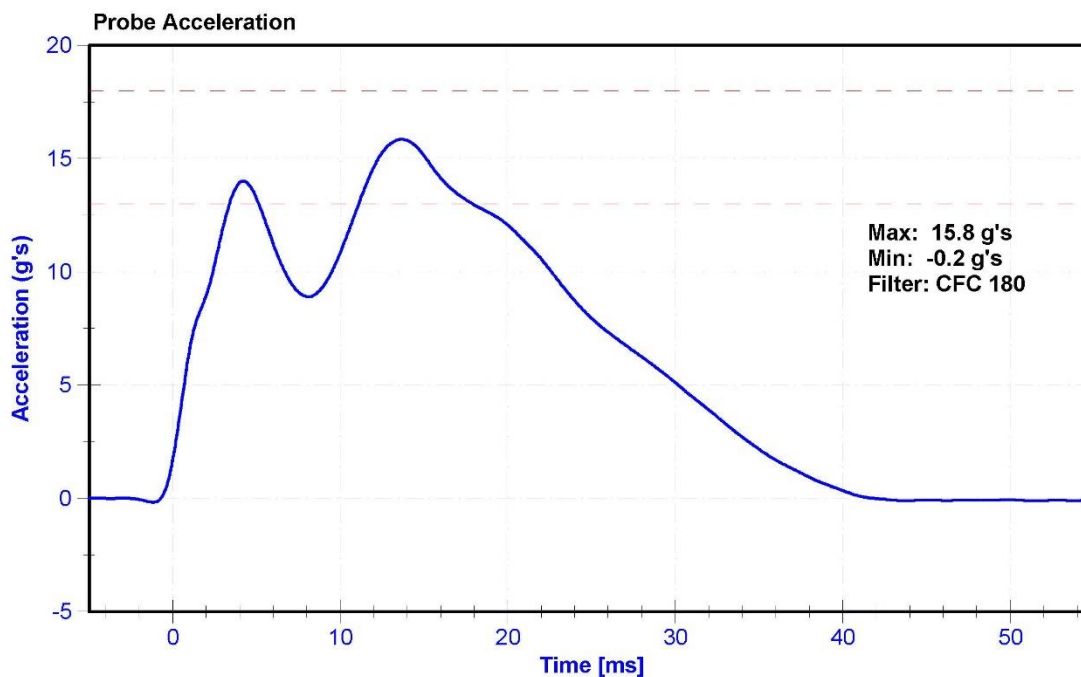
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

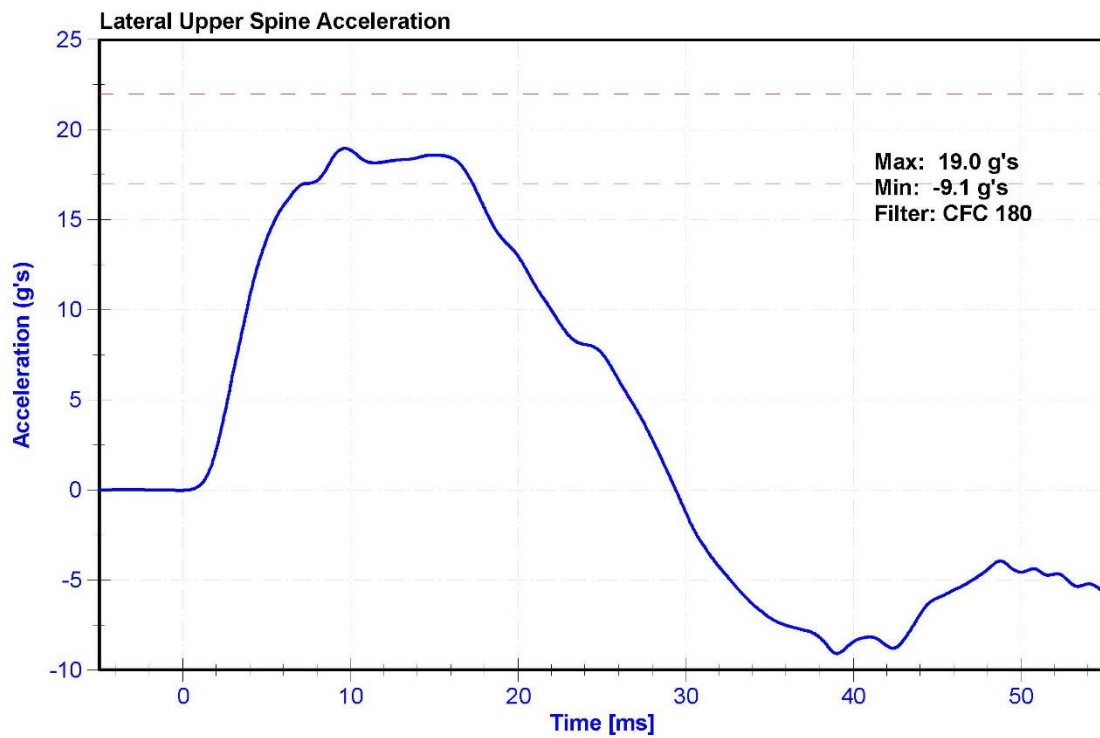
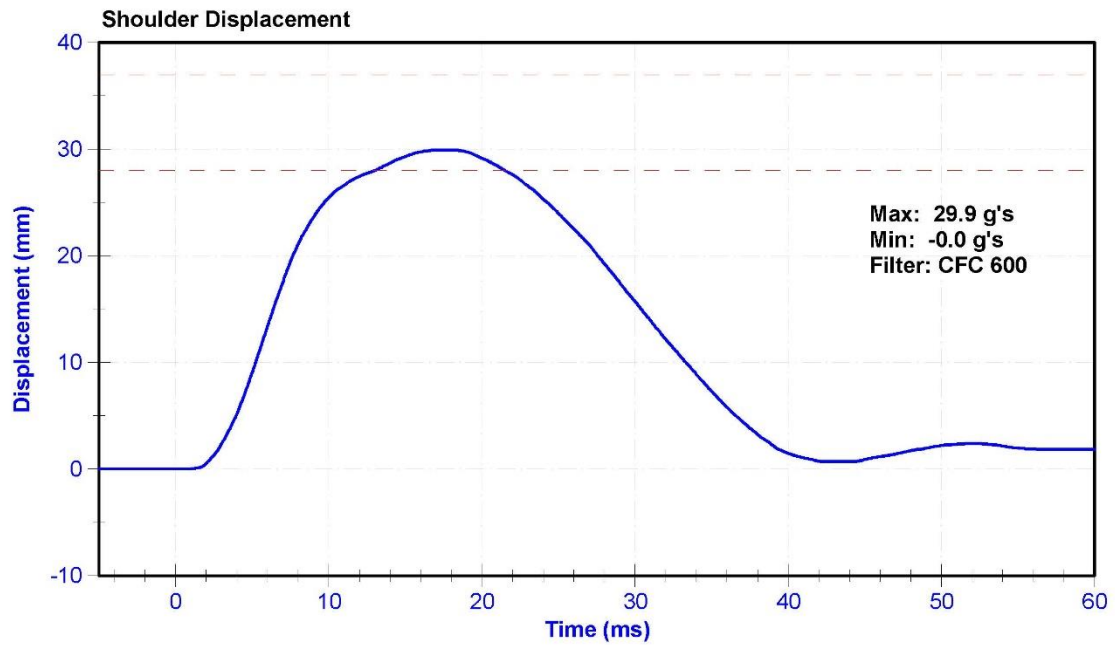
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	45.2	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	13	18	g's	15.8	Pass
Shoulder Deflection	28	37	mm	29.9	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.0	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	6/16/2016	6/16/2017
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	12/15/2016	6/15/2017





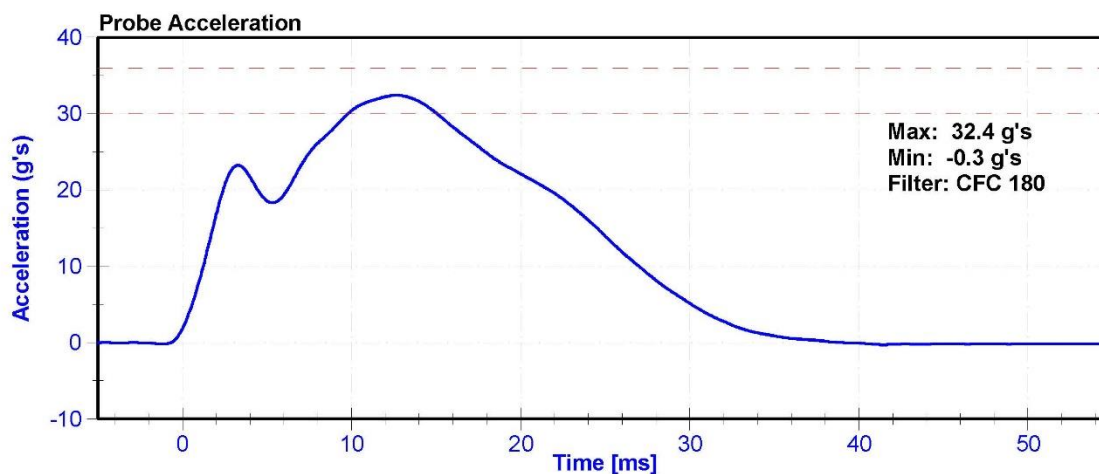
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

#### Results

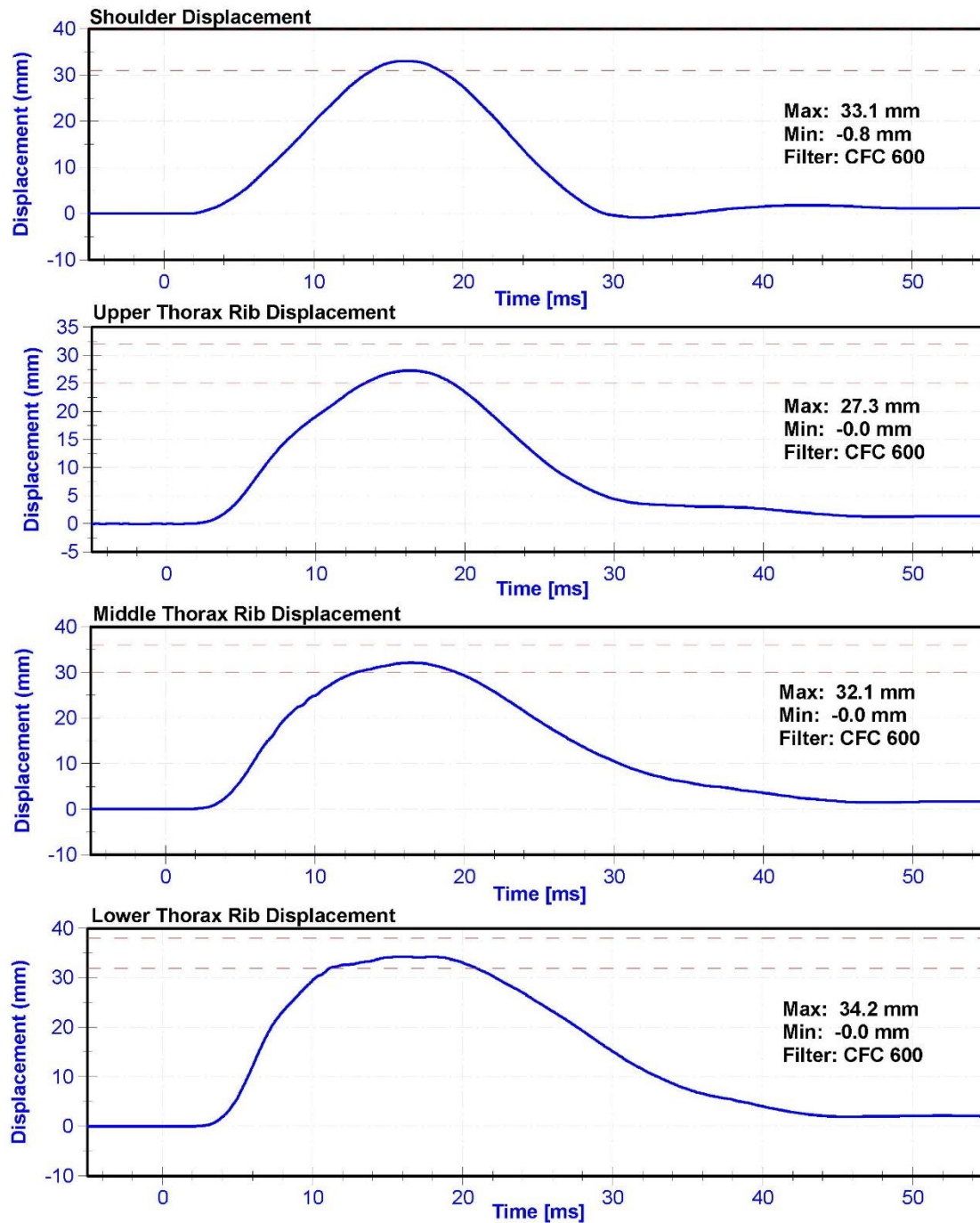
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	44.9	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration after 5 ms	30	36	g's	32.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	35.6	Pass
Lateral Lower Spine Acceleration	29	37	g's	31.9	Pass
Shoulder Deflection	31	40	mm	33.1	Pass
Upper Thorax Rib Deflection	25	32	mm	27.3	Pass
Mid Thorax Rib Deflection	30	36	mm	32.1	Pass
Lower Thorax Rib Deflection	32	38	mm	34.2	Pass

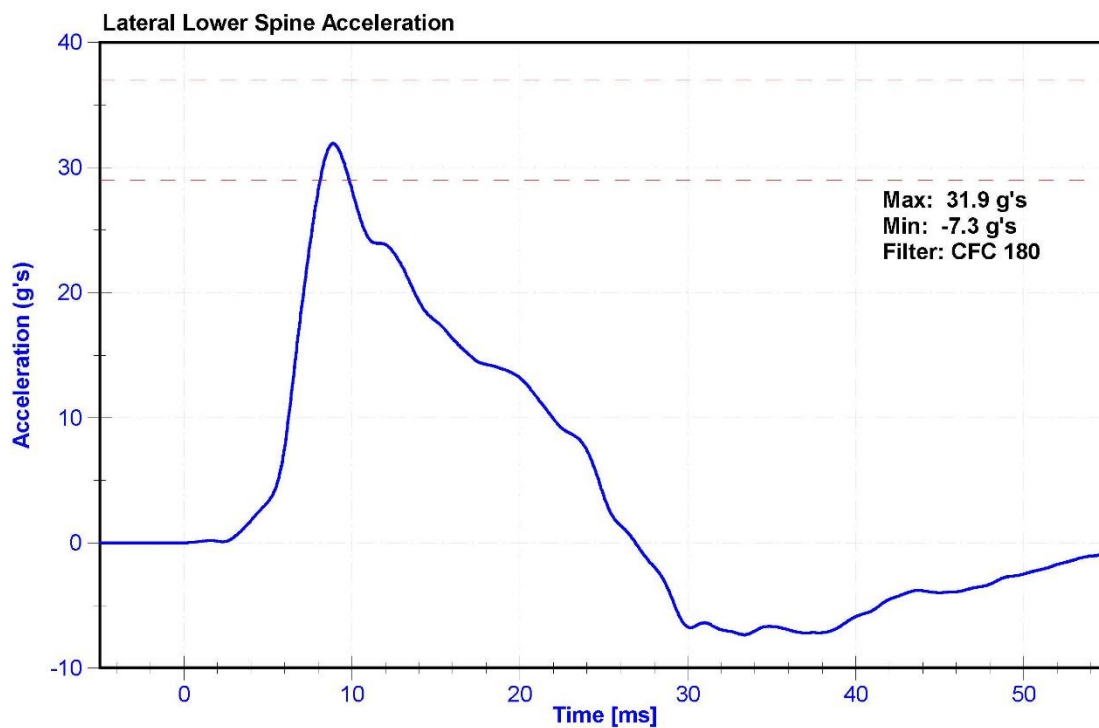
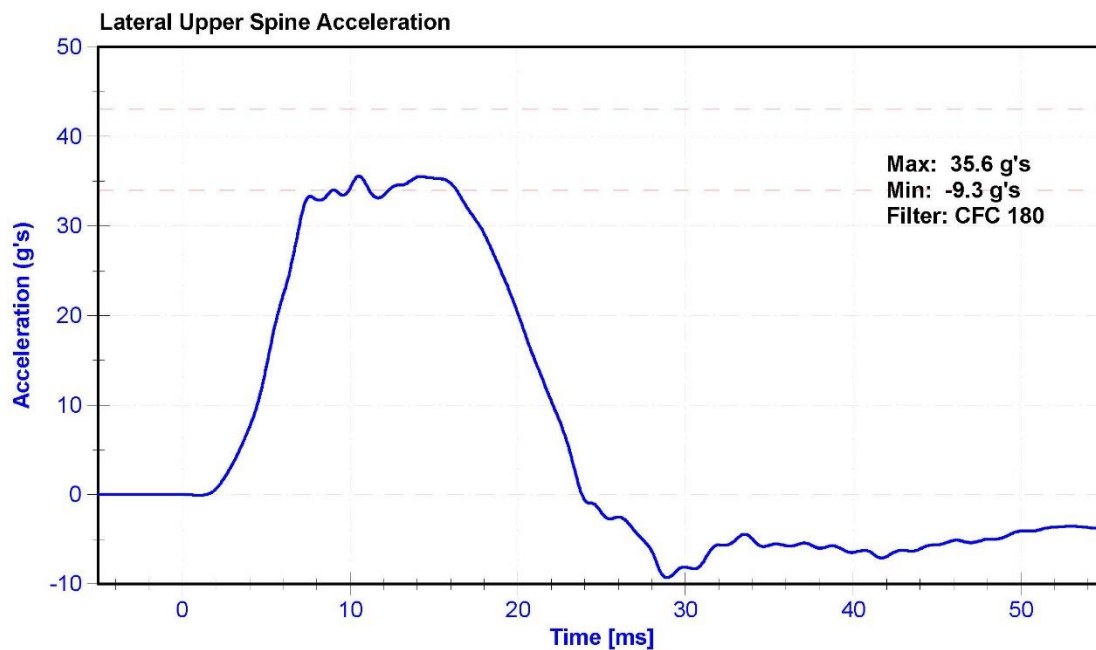
#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P51915	12/15/2016	6/15/2017
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	12/15/2016	6/15/2017
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	6/16/2016	6/16/2017
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	6/16/2016	6/16/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	6/16/2016	6/16/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	6/16/2016	6/16/2017









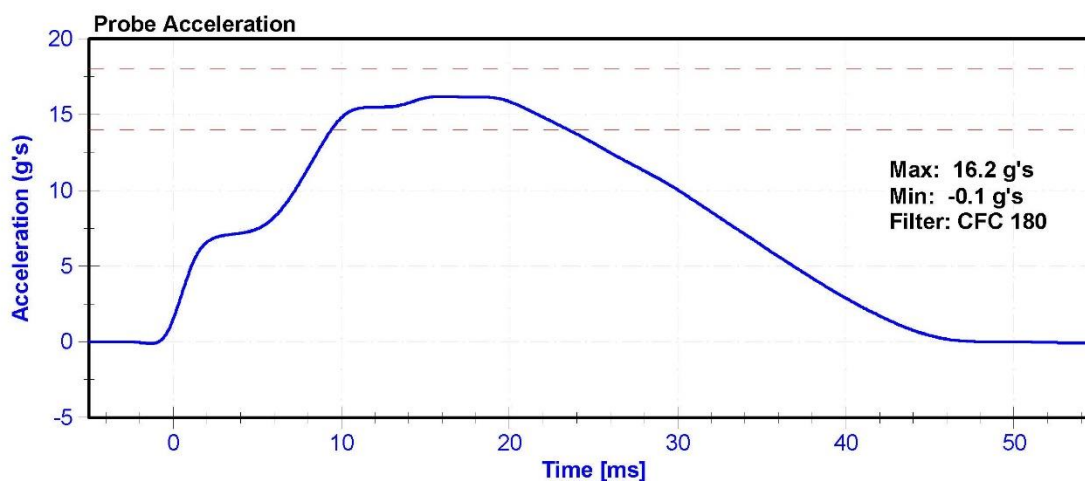
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

#### Results

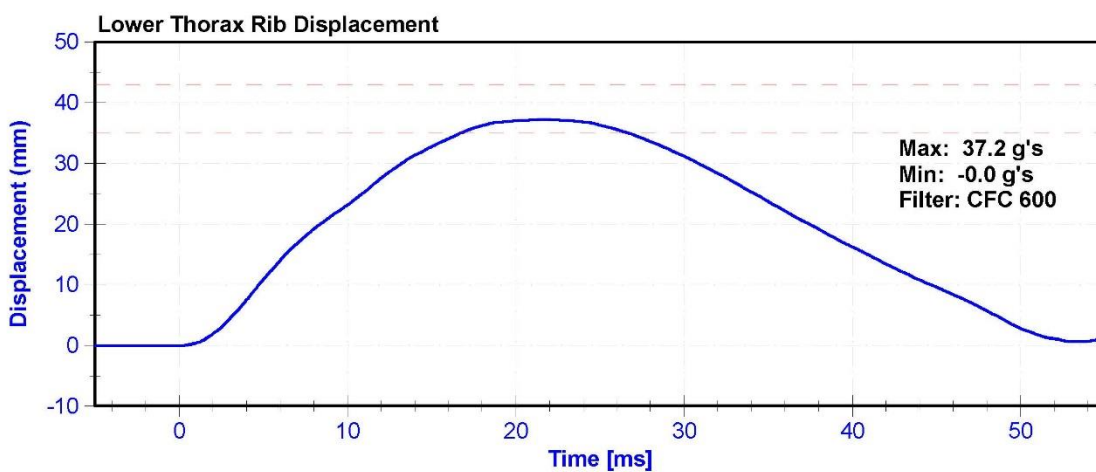
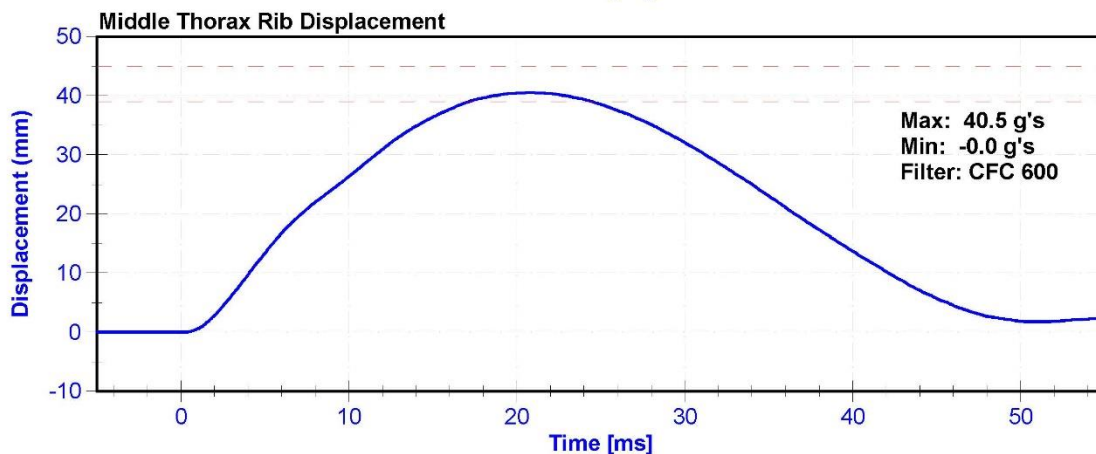
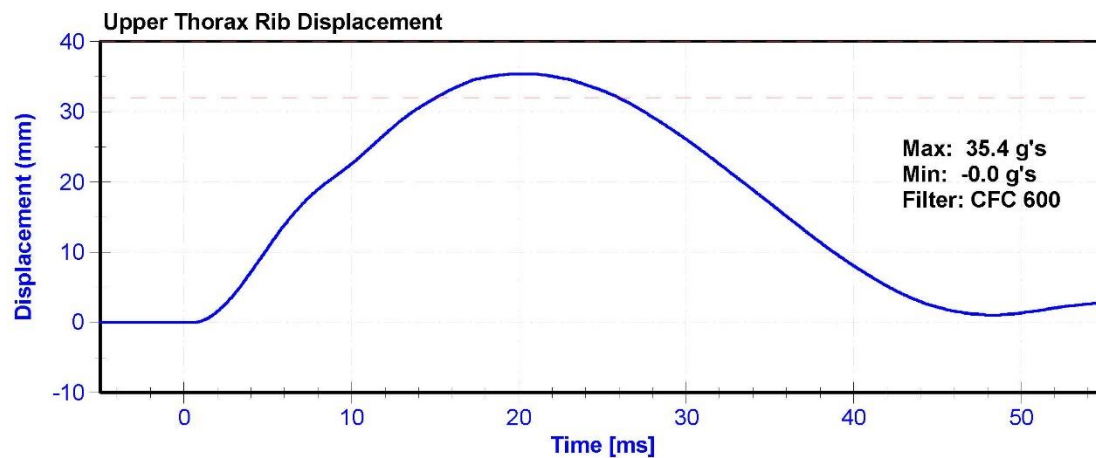
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	44.9	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	14	18	g's	16.2	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.2	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.5	Pass
Upper Thorax Rib Deflection	32	40	mm	35.4	Pass
Middle Thorax Rib Deflection	39	45	mm	40.5	Pass
Lower Thorax Rib Deflection	35	43	mm	37.2	Pass

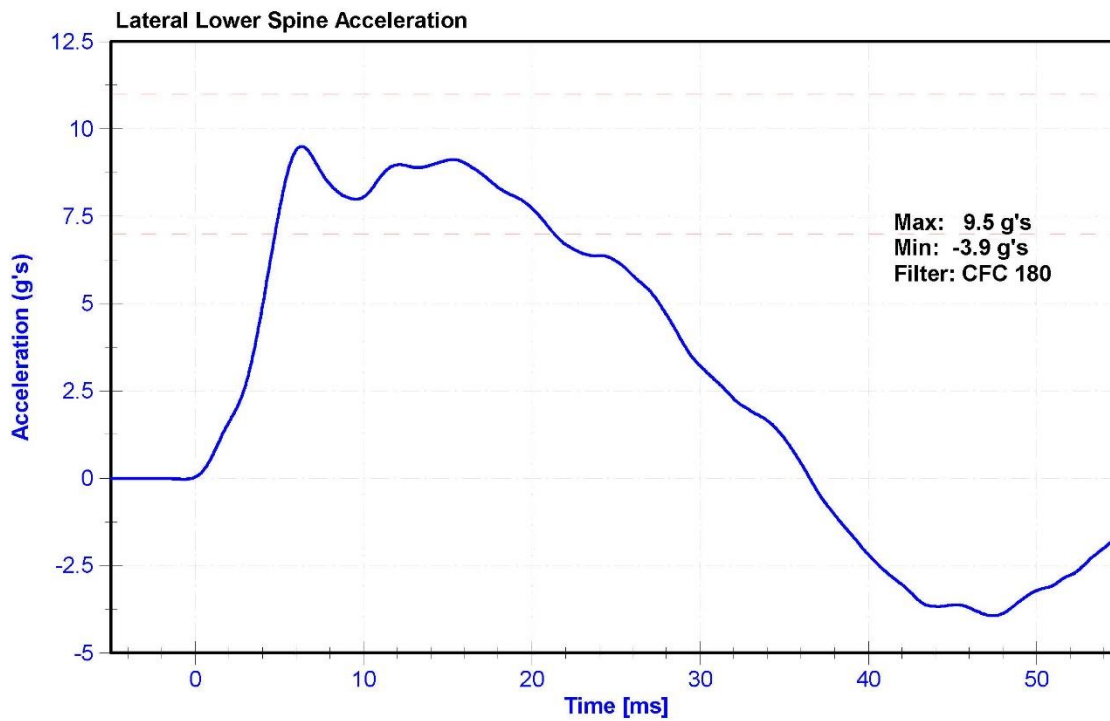
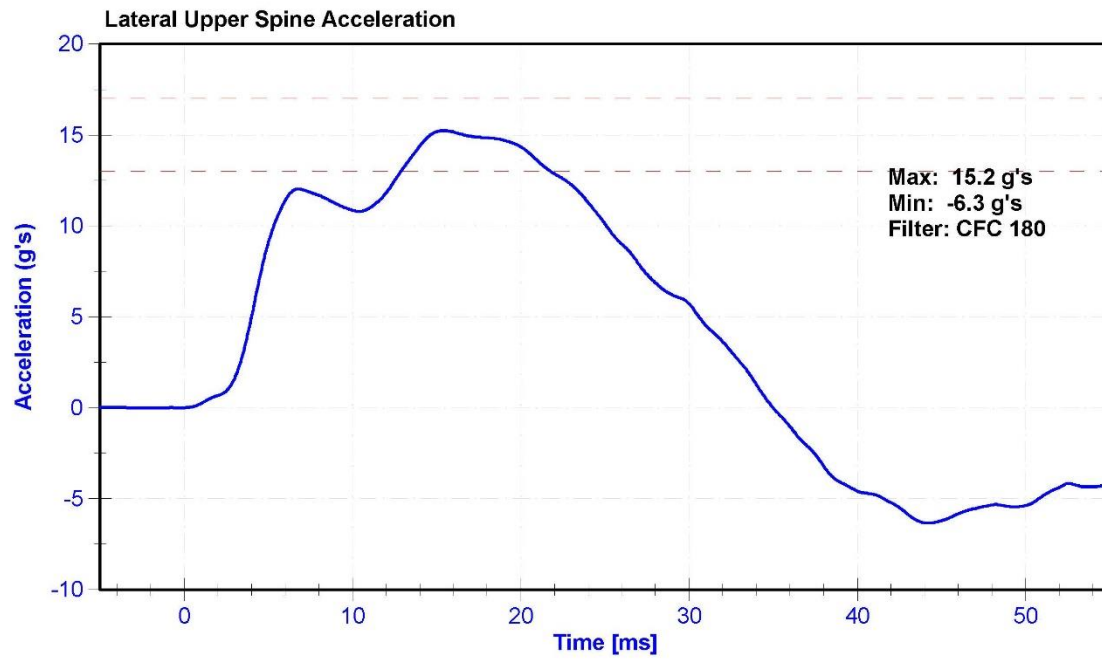
#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	12/15/2016	6/15/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	12/15/2016	6/15/2017
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	6/16/2016	6/16/2017
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	6/16/2016	6/16/2017
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	6/16/2016	6/16/2017









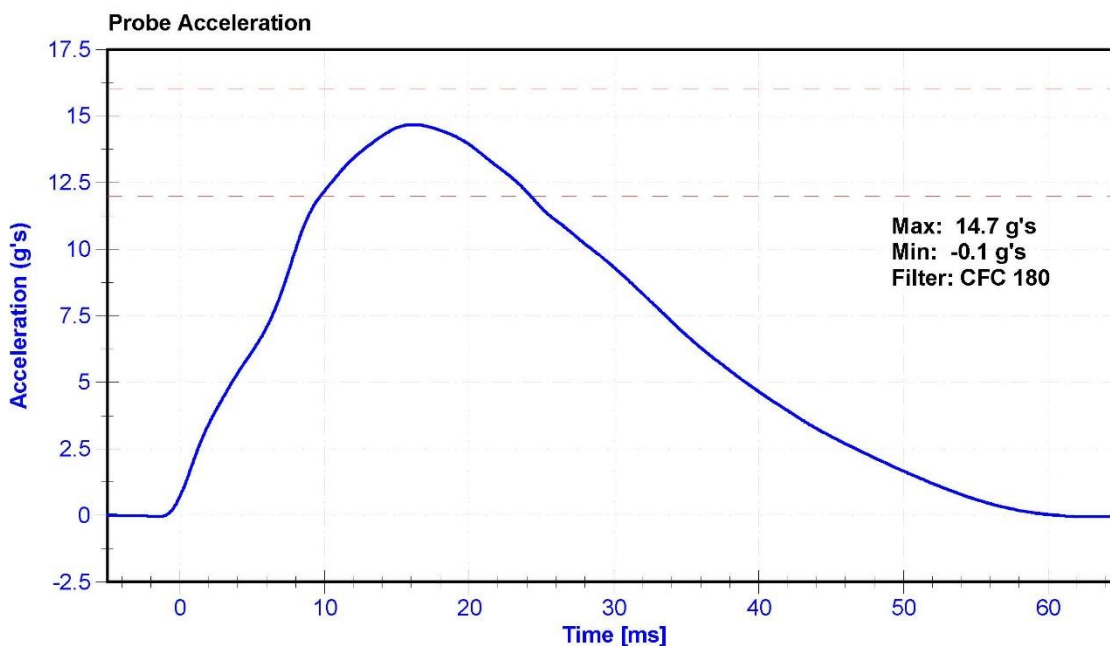
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

#### Results

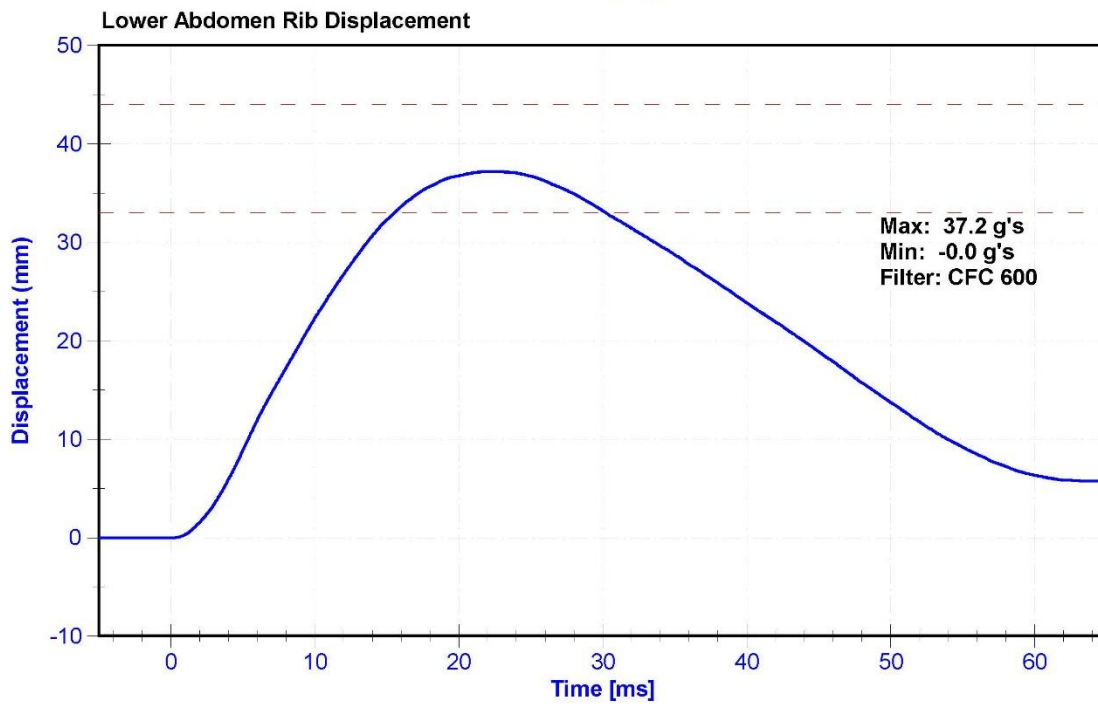
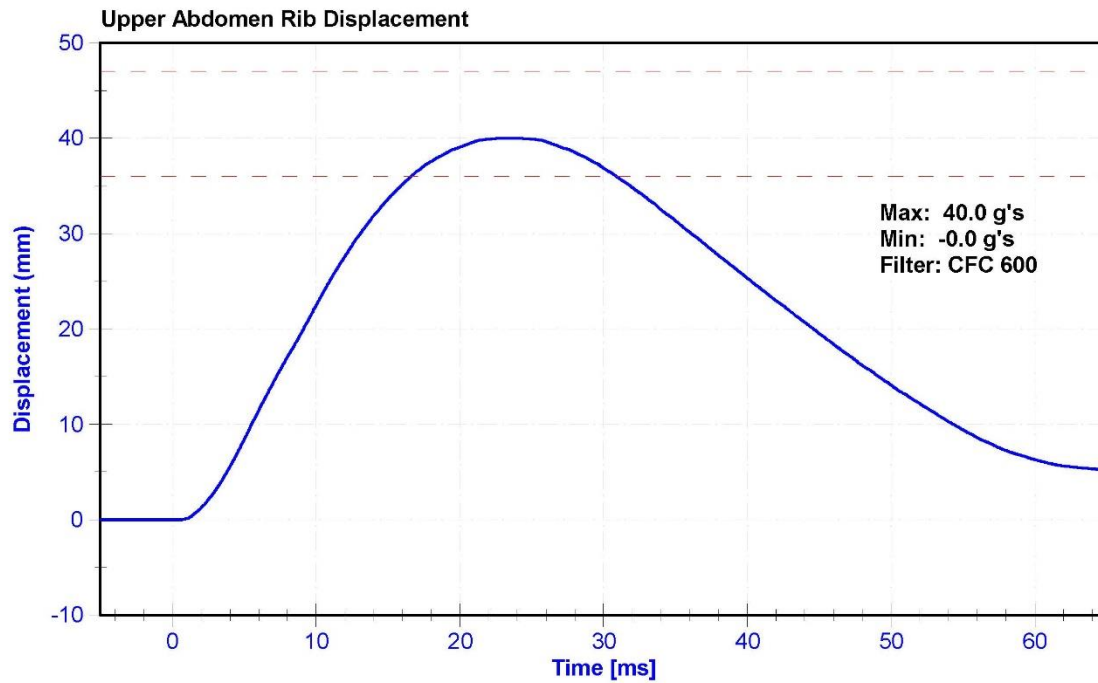
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	47.6	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	14.7	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.1	Pass
Upper Abdomen Rib Deflection	36	47	mm	40.0	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.2	Pass

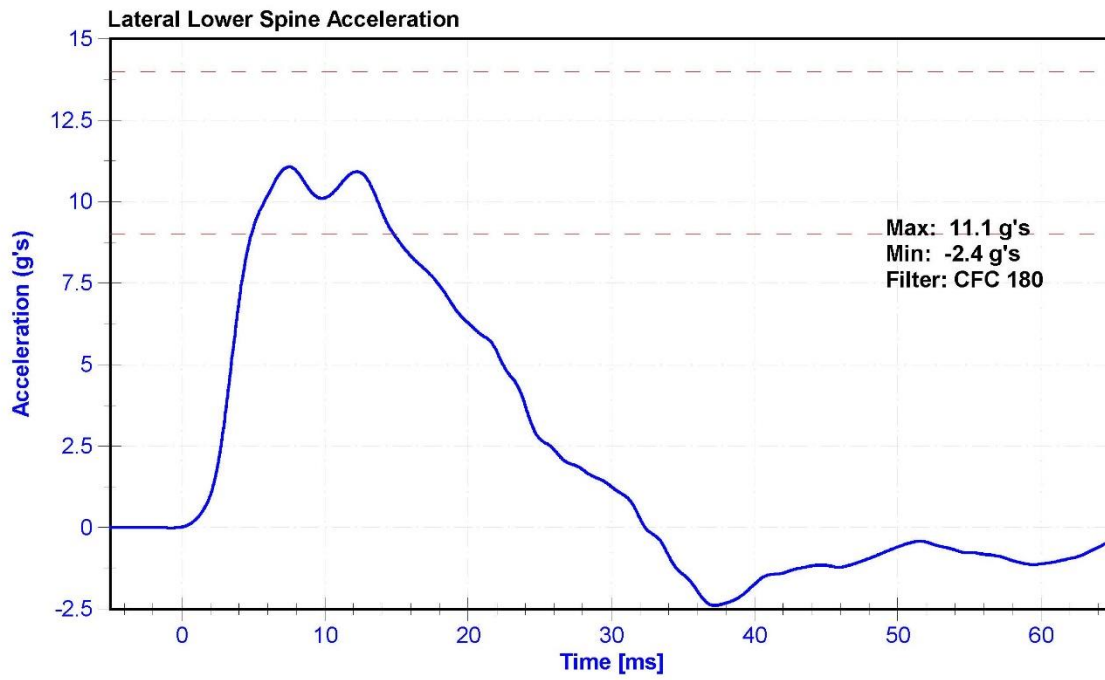
#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	12/15/2016	6/15/2017
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	6/16/2016	6/16/2017
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	6/16/2016	6/16/2017

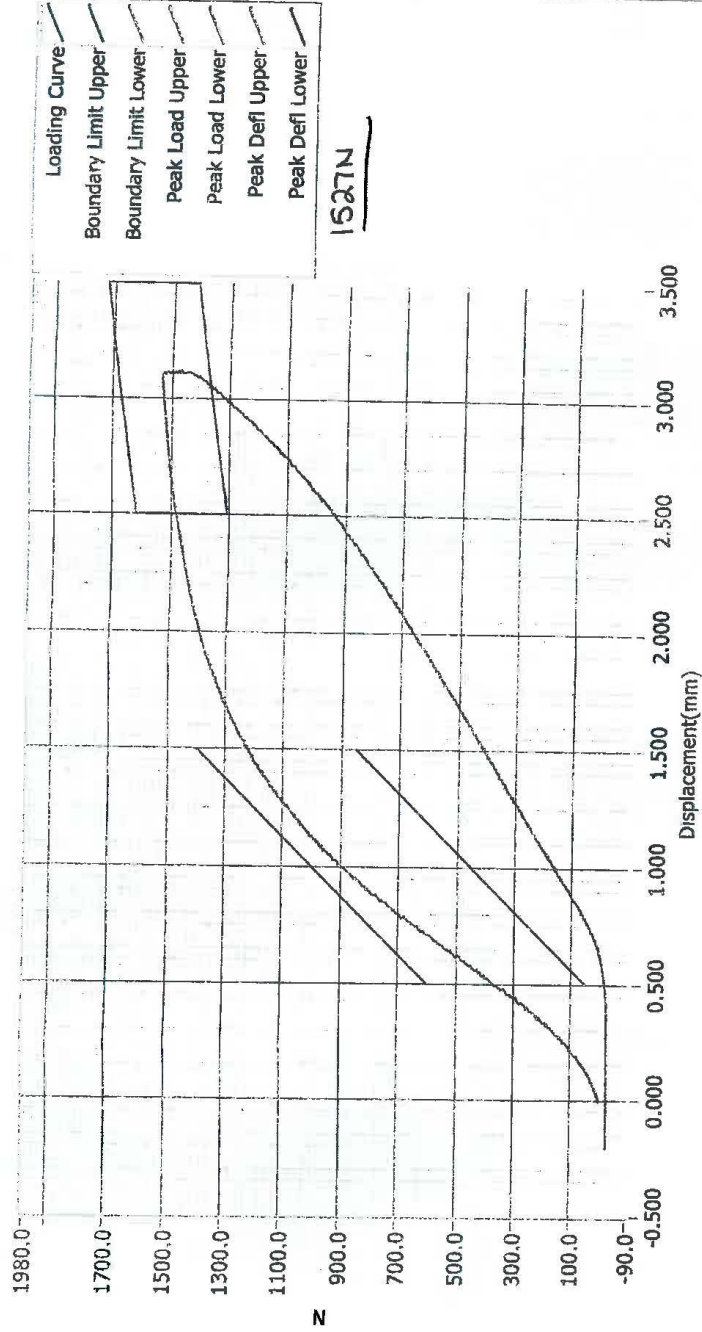








# Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

CERT

1527N

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	88012	7/22/2015	4:00 PM
	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 7/22/2015      Current Time : 16:01:00





# SID-Is Pelvis Plug Certification Test

Plug S/N 11057

CRASH

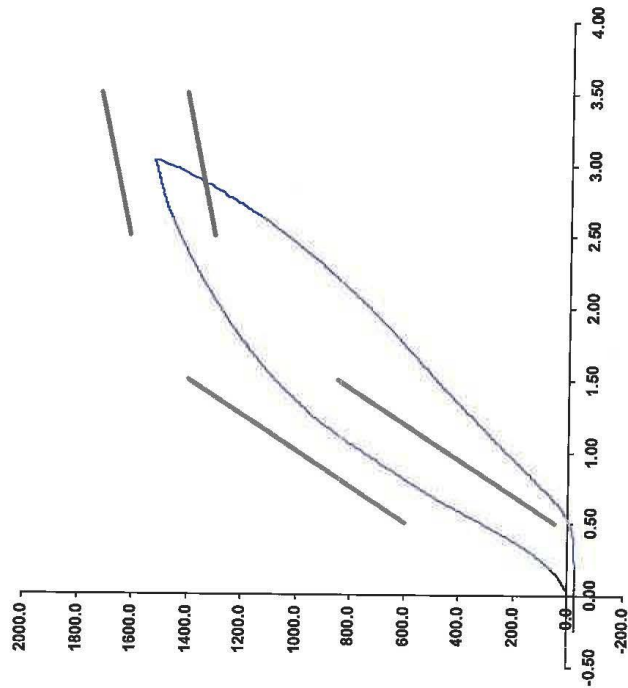
Test Number 2164

1527N

Report Number 2158

Test Date 4/8/2016 8:43:24 AM

Force (-N) vs Extension (-mm)



Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.00

Testing Machine STM-20 5965542

Load Cell S/N (T1240813), Units (LBS ) 1000

Crosshead Speed ( mm / min ) or Rate 12.7

Extension or Position Measured by XHD\_100 ( XHD100 )

Notes:

Template No 107	08-Apr-16	Operator DC
SACO Research		Part Number 180-4450

By: DC Date: 4/8/16

SACO Research 41735 Elm St, #401 Murietta, CA 92562 Tel 310-694-2082 FAX

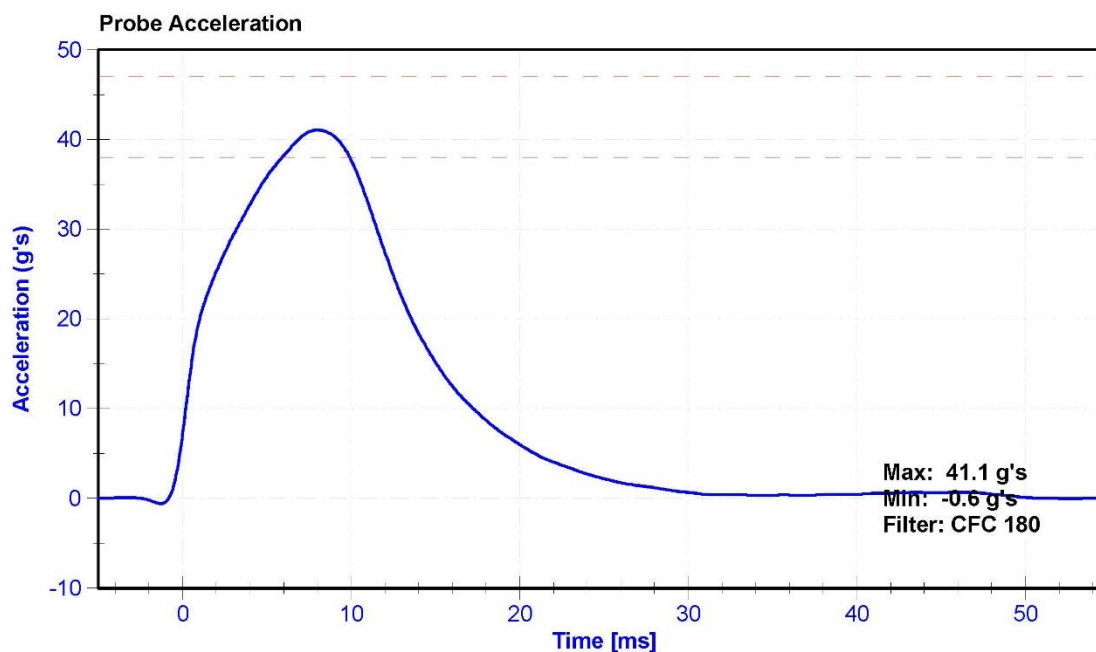
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

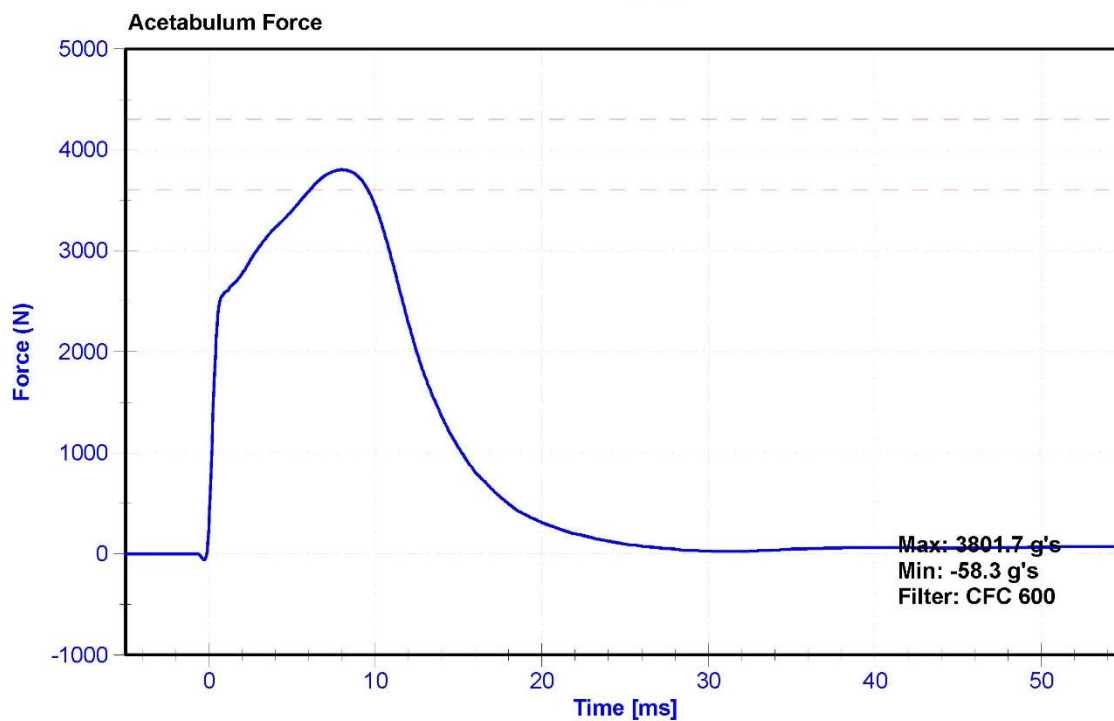
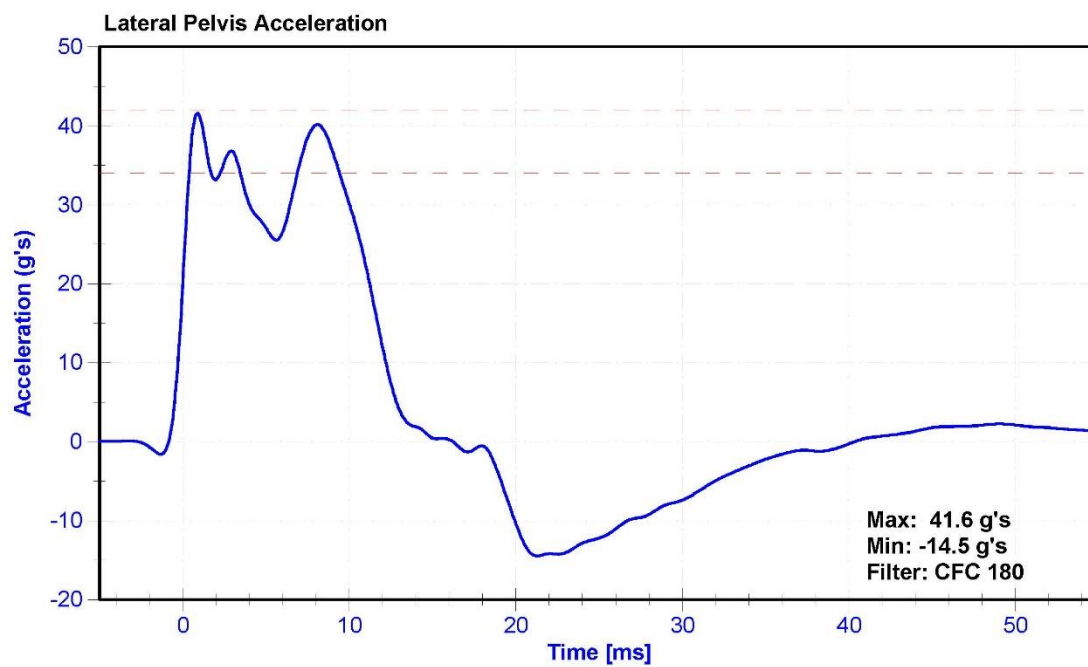
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	26.2	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration	38	47	g's	41.1	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.1	Pass
Acetabulum Force	3600	4300	N	3801.7	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	12/15/2016	6/15/2017
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	5/24/2016	5/24/2017
Certification Plug	Humanetics	88012	07/22/2015	N/A
Crash Test Plug	Humanetics	11057	04/08/2016	N/A







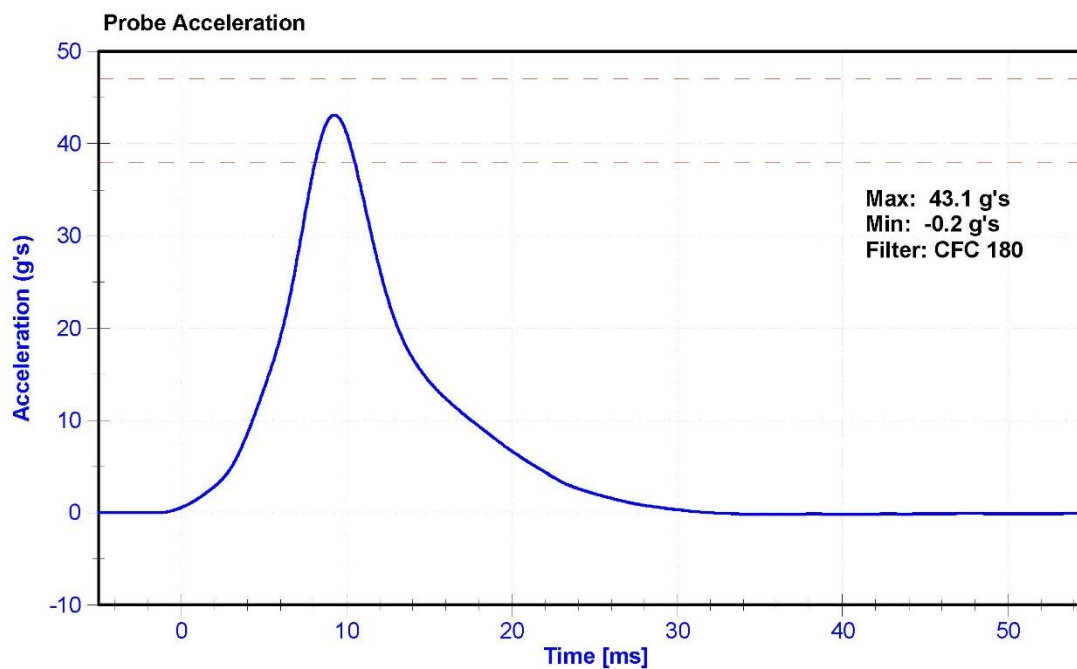
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

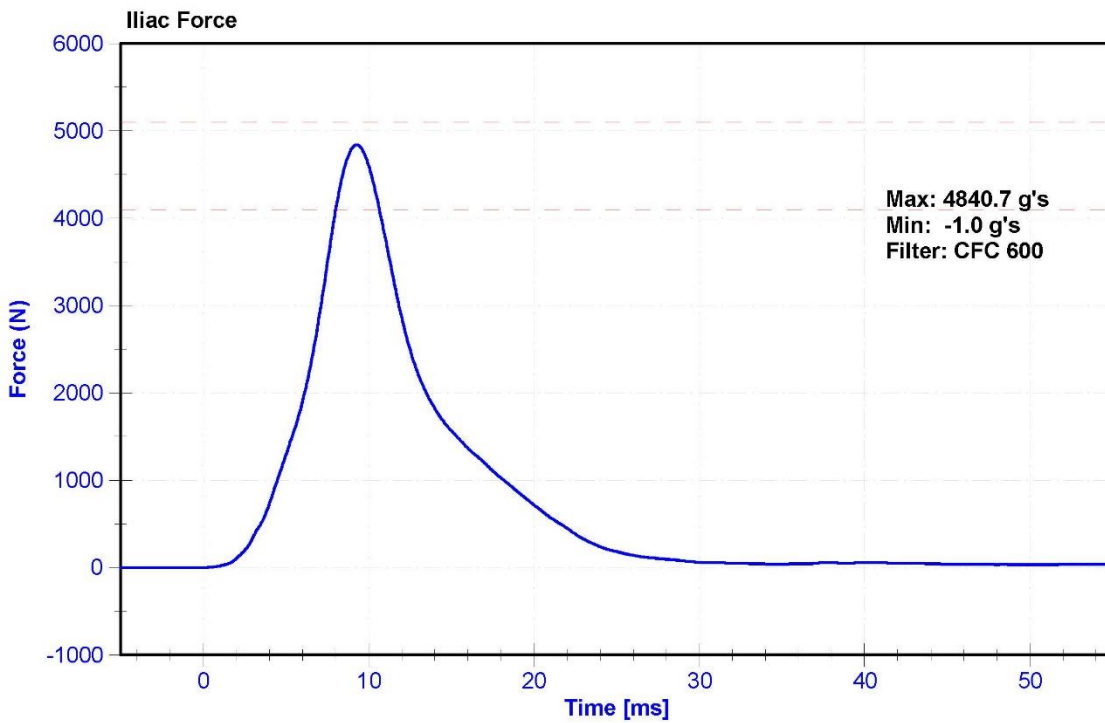
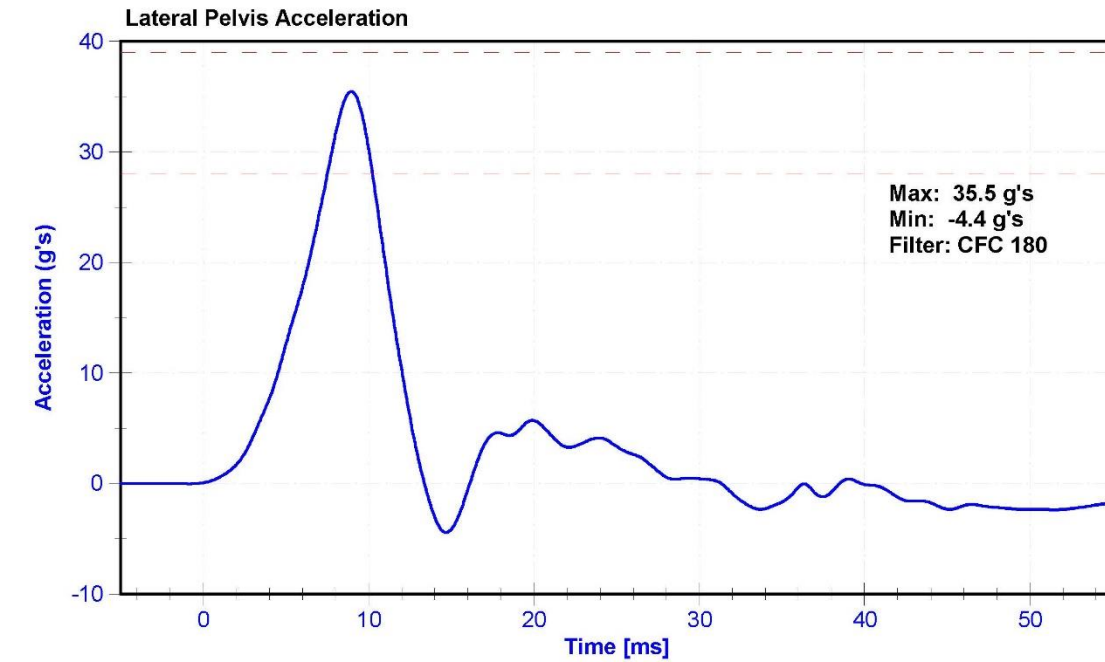
#### Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	49.5	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	43.1	Pass
Lateral Pelvis Acceleration	28	39	g's	35.5	Pass
Iliac Force	4100	5100	N	4840.7	Pass

#### Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P21393	5/27/2016	5/27/2017
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	12/15/2016	6/15/2017
Iliac Load Cell	DENTON 3228J	LC-279Fy	5/24/2016	5/24/2017





## **APPENDIX D**

### **TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**



**Table 1 – Dummy Instrumentation (SID-IIs)**

			SID-IIs S/N: 300			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers			X	AC-P58777	ENDEVCO	12/15/2016
			Y	AC-P59018	ENDEVCO	12/15/2016
			Z	AC-P68608	ENDEVCO	12/15/2016
Head Accelerometers - Redundant			X	AC-P52095	ENDEVCO	12/15/2016
			Y	AC-P58986	ENDEVCO	12/15/2016
			Z	AC-P68057	ENDEVCO	12/15/2016
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-451GFE	SERVO	6/16/2016
		Middle	Y	DS-1151GFE	SERVO	6/16/2016
		Lower	Y	DS-1156GFE	SERVO	6/16/2016
	Abdominal Rib	Upper	Y	DS-308GFE	SERVO	6/16/2016
		Lower	Y	DS-307GFE	SERVO	6/16/2016
Lower Spine Accelerometers (T12)			X	AC-P58883	ENDEVCO	12/15/2016
			Y	AC-P64147	ENDEVCO	12/15/2016
			Z	AC-P58786	ENDEVCO	12/15/2016
Acetabulum Load Cell			Y	LC-275Fy	DENTON	5/24/2016
Lilac Wing Load Cell			Y	LC-279Fy	DENTON	5/24/2016
Pelvis Plug (Struck Side)				11014	SACO	4/6/2016
Pelvis Plug (Non-Struck Side)						

**Table 2 – Vehicle Instrumentation**

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	AC-A192203	Measurement	10/13/2016
Vehicle Center of Gravity	Y	AC-A192208	Measurement	10/13/2016
Vehicle Center of Gravity	Z	AC-A192222	Measurement	10/13/2016
Left Floor Sill	Y	AC-A120607	MSI 1201	11/21/2016
A-Pillar Sill	Y	AC-A192206	Measurement	10/17/2016
A-Pillar Low	Y	AC-A189589	MSI 1201-1000	10/17/2016
A-Pillar Mid	Y	AC-A189596	MSI 1201-1000	10/17/2016
B-Pillar Sill	Y	AC-A196979	MSI 1201-1000	10/26/2016
B-Pillar Low	Y	AC-A197030	MSI 1201-1000	10/26/2016
B-Pillar Mid	Y	AC-A197050	MSI 1201-1000	10/26/2016
Driver Seat	Y	AC-A192198	MSI 1201-1000	11/21/2016
Engine Top	X	AC-A189620	MSI 1201-1000	1/5/2017
Engine Top	Y	AC-A196991	MSI 1201-1000	10/26/2016
Firewall	Y	AC-A192217	Measurement	10/13/2016
Right Roof	Y	AC-A184924	MSI 1201-1000	10/25/2016
Right Floor Sill	Y	AC-A156950	MSI 1201	10/14/2016
Rear Floorpan	X	AC-A184944	MSI 1201-1000	10/25/2016
Rear Floorpan	Y	AC-A196602	MSI 1201-1000	10/25/2016

**Table 3 – Pole Instrumentation**

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC-18879	INTERFACE	6/30/2016
Load Cell 2	LC-18852	INTERFACE	6/30/2016
Load Cell 3	LC-46955	INTERFACE	6/30/2016
Load Cell 4	LC-18882	INTERFACE	6/30/2016
Load Cell 5	LC-18864	INTERFACE	6/30/2016
Load Cell 6	LC-18847	INTERFACE	6/30/2016
Load Cell 7	LC-62086	INTERFACE	6/30/2016
Load Cell 8	LC-46962	INTERFACE	6/30/2016